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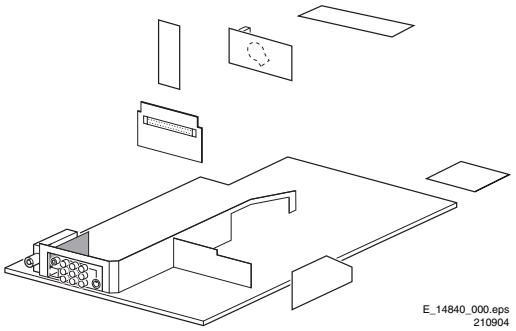

Service Manual

Contents		Page
1. Technical Specifications, Connections, and Chassis Overview		2
2. Safety Instructions, Warnings, and Notes		4
3. Directions for Use		7
4. Mechanical Instructions		8
5. Service Modes, Error Codes, and Fault Finding		10
6. *Block Diagrams, Testpoint Overviews, and Waveforms*		
Wiring Diagram for Standard		19
Wiring Diagram for System		20
Block Diagram Supply and Deflection		21
Testpoint Overview Mono Carrier		22
Block Diagram Video		23
Testpoint Overview CRT Panel		24
Block Diagram Audio/Control		25
I2C and Supply Voltage Overview		26
I2C and Supply Voltage Overview		26
7. *Circuit Diagrams and PWB Layouts*		*Diagram* *PWB*
Mono Carrier: Power Supply	(A1)	27 39-44
Mono Carrier: Diversity Table for A1		28 39-44
Mono Carrier: Deflection	(A2)	29 39-44
Mono Carrier: Diversity Table for A2 (Deflection)		29 39-44
Mono Carrier: Tuner IF	(A3)	31 39-44
Mono Carrier: Hercules	(A4)	32 39-44
Mono Carrier: Features & Connectivities	(A5)	33 39-44
Mono Carrier: Class D - Audio Amplifier	(A6)	34 39-44
Mono Carrier: Audio Amplifier	(A7)	35 39-44
Mono Carrier: Rear I/O Cinch	(A8)	36 39-44
Mono Carrier: Front Control	(A9)	37 39-44
Mono Carrier: DVD Power Supply	(A10)	38 39-44
CRT Panel	(B1)	45 47-48
CRT Panel: Eco Scavem	(B2)	46 47-48
Side AV + Headphone Panel	(D)	49 50
Top Control Panel	(E)	51 51

Contents		Page
EPS 4 (External Power Supply)	(F)	52 53
Linearity & Panorama Panel	(G)	54 54
UIR SP External Speakers Panel	(I)	55 56
Front Interface Panel (FL-13)	(J)	57 57
Interface Module	(J1)	58 61
Interface Module: Diversity Table Part 2	(J1)	60 61
Mains Harmonic Module	(U)	62 62
8. Alignments		63
9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets		68
Abbreviation List		78
IC Data Sheets		79
10. Spare Parts List		80
11. Revision List		84

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

1.1 Technical Specifications
1.2 Connections
1.3 Chassis Overview

Notes:

- Described specifications are valid for the *whole* product range.
- Figures below can deviate slightly from the actual situation, due to different set executions.

1.1 Technical Specifications

1.1.1 Vision

Display type	:	DV-CRT-RF
Screen size	:	21” (53 cm), 4:3
	:	25” (63 cm), 4:3
	:	29” (72 cm), 4:3
	:	34” (85 cm), 4:3
Tuning system	:	PLL
TV Colour systems	:	NTSC M (3.58-4.5)
	:	PAL B/G, B/H, D/K, I
Video playback	:	NTSC 3.58, 4.43
	:	PAL 4.43
Channel selections	:	100 presets
	:	UVSH
Aerial input	:	75 ohm, Coax
	:	IEC-type

1.1.2 Sound

Sound systems	:	2CS BG, D/K,
	:	FM/FM (5.5-5.74 B/G)
	:	FM/FM (6.5-6.74) (China),
	:	NICAM B/G (5.5-5.85),
	:	NICAM D/K (6,5-5,85) Hung.
	:	Nicam I (6.0-6.52)
	:	AV-stereo
Maximum power	:	2x10/ 2x5 W_rms (int.)

1.1.3 Miscellaneous

Power supply:		
- Mains voltage	:	150 - 276 V_ac
- Mains frequency	:	50/60 Hz
Ambient conditions:		
- Temperature range	:	+5 to +40 °C
- Maximum humidity	:	90 % R.H.
Power consumption		
- Normal operation	:	from 60 W (21”)
	:	to 91 W (32”)
- Standby	:	< 1 W

1.2 Connections

Note: The following connector colour abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, Ye= Yellow.

1.2.1 Side Connections

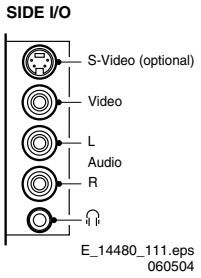


Figure 1-1 Side I/O

S-Video: Y/C - In (Hosiden) (optional)

1	- Ground	Gnd
2	- Ground	Gnd
3	- Y	1 V_pp / 75 ohm
4	- C	0.3 V_pp / 75 ohm

Audio / Video In

Ye	- Video (CVBS)	1 V_pp / 75 ohm
Wh	- Audio - L	0.5 V_rms / 10 kohm
Rd	- Audio - R	0.5 V_rms / 10 kohm
Bk	- Headphone	8 - 600 Ohm / 4 mW

1.2.2 Rear Connections

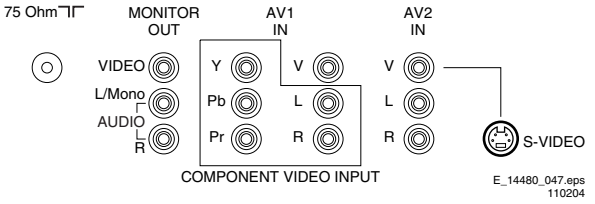


Figure 1-2 Rear connections

Aerial In

	- F-type	Coax, 75 ohm

Monitor Out

Ye	- Video (CVBS)	1 V_pp / 75 ohm
Wh	- Audio - L	0.5 V_rms / 1 kohm
Rd	- Audio - R	0.5 V_rms / 1 kohm

YUV In

Gn	- Y	0.7 V_pp / 75 ohm
Bu	- Pb	0.7 V_pp / 75 ohm
Rd	- Pr	0.7 V_pp / 75 ohm

AV1 In

Ye	- Video (CVBS)	1 V_pp / 75 ohm
Wh	- Audio - L	0.5 V_rms / 10 kohm
Rd	- Audio - R	0.5 V_rms / 10 kohm

AV1 In (SVHS)

1	- Ground	GND
2	- Ground	GND
3	- Y	1 V_pp / 75 ohm
4	- C	0.3 V_pp / 75 ohm

1.3 Chassis Overview

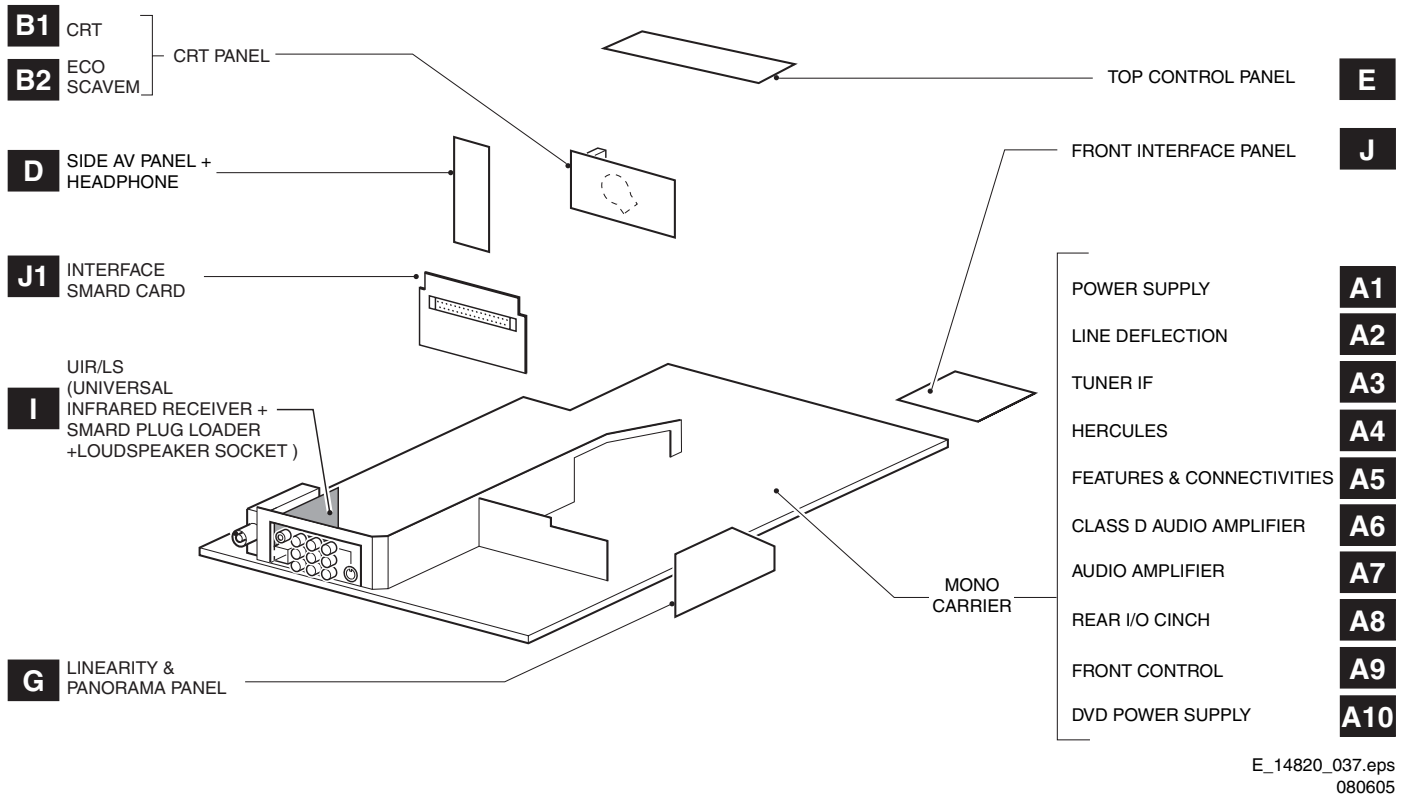


Figure 1-3 PWB location

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions
2.2 Maintenance Instructions
2.3 Warnings
2.4 Notes

2.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.
- Wear safety goggles when you replace the CRT.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current flows. In particular this is valid for the:
  1. Pins of the line output transformer (LOT).
  2. Fly-back capacitor(s).
  3. S-correction capacitor(s).
  4. Line output transistor.
  5. Pins of the connector with wires to the deflection coil.
  6. Other components through which the deflection current flows.

Note: This re-soldering is advised to prevent bad connections due to metal fatigue in solder connections, and is therefore only necessary for television sets more than two years old.

- Route the wire trees and EHT cable correctly and secure them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
  1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
  2. Set the Mains/AC Power switch to the "on" position (keep the Mains/AC Power cord unplugged!).
  3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
  4. Switch "off" the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

2.2 Maintenance Instructions

We recommend a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:

- When a customer uses the set under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When a customer uses the set in an environment with higher dust, grease, or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:
  1. Perform the “general repair instruction” noted above.
  2. Clean the power supply and deflection circuitry on the chassis.
  3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in figure “Discharge picture tube”, to discharge the picture tube. Use a high voltage probe and a multi-meter (position V_{DC}). Discharge until the meter reading is 0 V (after approx. 30 s).

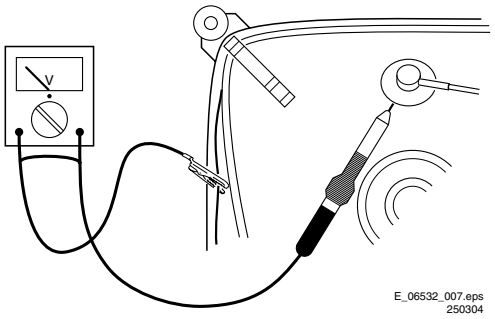


Figure 2-1 Discharge picture tube

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential. Available ESD protection equipment:
  – Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and earth cable) 4822 310 10671.
  – Wristband tester 4822 344 13999.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched "on".
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and prevents circuits from becoming unstable.

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

- Manufactured under license from Dolby Laboratories. “Dolby”, “Pro Logic” and the “double-D symbol”, are trademarks of Dolby Laboratories.

2.4.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads (μ= x10^{-6}), nano-farads (n= x10^{-9}), or pico-farads (p= x10^{-12}).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Spare Parts List. Therefore, always check this list when there is any doubt.

2.4.3 Rework on BGA (Ball Grid Array) ICs

General

Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF)BGA is removed from a PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

Device Removal

As is the case with any component that is being removed, it is essential when removing an (LF)BGA, that the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the risk of warping the PWB. To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

Area Preparation

When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA.
Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent.
After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA.
Note: Do not apply solder paste, as this has been shown to result in problems during re-soldering.

Device Replacement

The last step in the repair process is to solder the new component on the board. Ideally, the (LF)BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers. So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times.

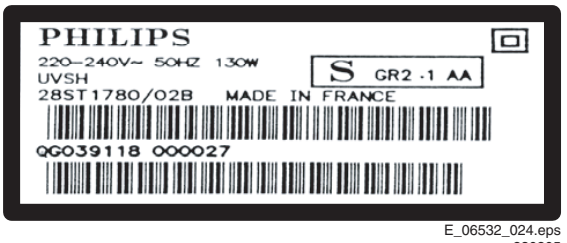
More Information

For more information on how to handle BGA devices, visit this URL: *www.atyourservice.ce.philips.com* (needs subscription, not available for all regions). After login, select “Magazine”, then go to “Workshop Information”. Here you will find Information on how to deal with BGA-ICs.

2.4.4 Lead-free Solder

Philips CE is producing lead-free sets (PBF) from 1.1.2005 onwards.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 5 and 6 refer to the production year, digits 7 and 8 refer to production week (in example below it is 1991 week 18).



E_06532_024.eps
230205

Figure 2-2 Serial number example

Regardless of the special lead-free logo (which is not always indicated), one must treat all sets from this date onwards according to the rules as described below.

Figure 2-3 Lead-free logo

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
  - To reach a solder-tip temperature of at least 400°C.
  - To stabilise the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilised at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly **to avoid** mixed regimes. If this cannot be avoided, carefully clean the solder-joint from old tin and re-solder with new tin.
- Use only original spare-parts listed in the Service-Manuals. Not listed standard material (commodities) has to be purchased at external companies.
- Special information for lead-free BGA ICs: these ICs will be delivered in so-called "dry-packaging" to protect the IC against moisture. This packaging may only be opened shortly before it is used (soldered). Otherwise the body of the IC gets "wet" inside and during the heating time the structure of the IC will be destroyed due to high (steam-) pressure inside the body. If the packaging was opened before usage, the IC has to be heated up for some hours (around 90°C) for drying (think of ESD-protection!).
  Do not re-use BGAs at all!

- For sets produced before 1.1.2005, containing leaded soldering tin and components, all needed spare parts will be available till the end of the service period. For the repair of such sets nothing changes.

In case of doubt whether the board is lead-free or not (or with mixed technologies), you can use the following method:

- Always use the highest temperature to solder, when using SAC305 (see also instructions below).
- De-solder thoroughly (clean solder joints to avoid mix of two alloys).

Caution: For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, visit the website *www.atyourservice.ce.philips.com* (needs subscription, but is not available for all regions)
You will find this and more technical information within the "Magazine", chapter "Workshop information".
For additional questions please contact your local repair help desk.

2.4.5 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3. Directions for Use

You can download this information from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

4. Mechanical Instructions

Index of this chapter:

4.1 Set Disassembly
4.2 Service Position
4.3 Assies/Panels Removal
4.4 Set Re-assembly

Note: Figures below can deviate slightly from the actual situation, due to different set executions.

4.1 Set Disassembly

Warning: Be sure to disconnect the Mains from the set before opening it.

4.1.1 Rear Cover

1. Remove all fixation screws of the rear cover (do not forget the screws that hold the rear connection panel).
2. Pull the rear cover backwards to remove it.

4.2 Service Position

Before placing the Mono Carrier in its service position, remove the Front Interface assy/panel (see paragraph “Front Interface Assy/Panel removal”), the Side AV assy/panel (see paragraph “Side AV Assy/Panel removal”) and the PIP assy/panel (if exists) (see paragraph “PIP Assy/Panel removal”).

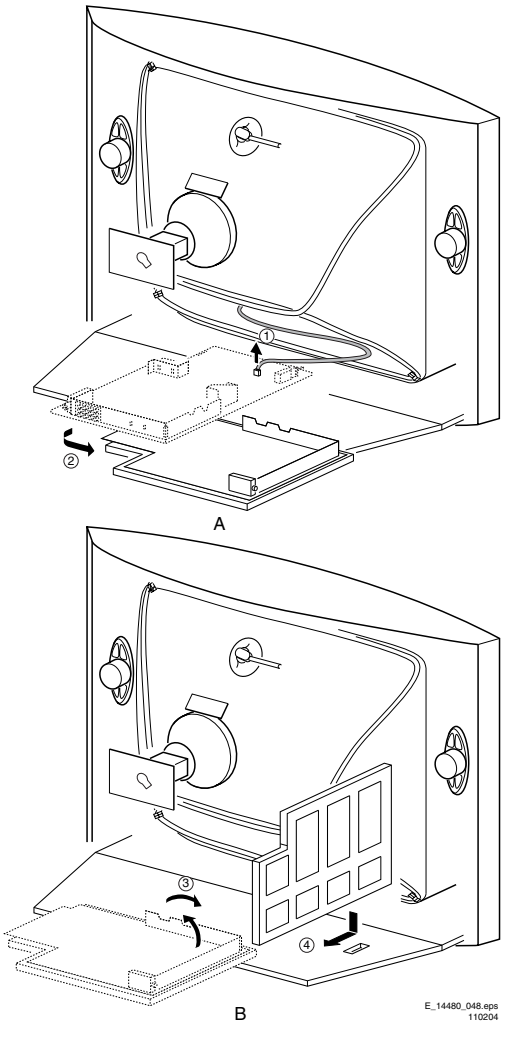


Figure 4-1 Service position Mono Carrier

1. Disconnect the degaussing coil [1].
2. Release the two fixation clamps (at the mid left and mid right side of the bracket), and remove the bracket from the bottom tray, by pulling it backwards [2].
3. Turn the chassis tray 90 degrees counter clockwise.
4. Move the panel bracket somewhat to the left and flip it 90 degrees [3], with the components towards the CRT.
5. Turn the panel bracket with the rear I/O toward the CRT.
6. Place the hook of the tray in the fixation hole of the cabinet bottom [4] and secure it.

4.3 Assies/Panels Removal

4.3.1 Front Interface Assy/Panel Removal

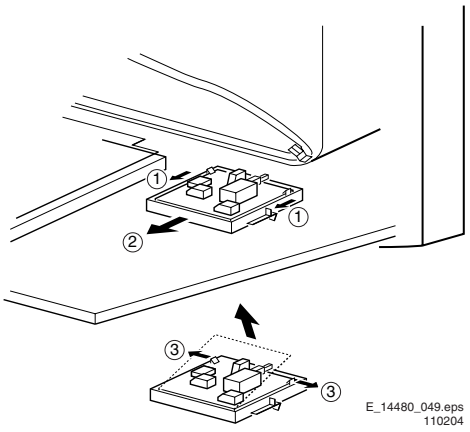


Figure 4-2 Front interface assy/panel removal

1. Remove the complete module from the bottom plate, by pulling the two fixation clamps upward [1], while sliding the module away from the CRT [2].
   Note: these clamps are difficult to access.
2. Release the two fixation clamps [3] at the side of the bracket, and lift the panel out of the bracket (it hinges at one side).

4.3.2 Side AV Assy/Panel Removal

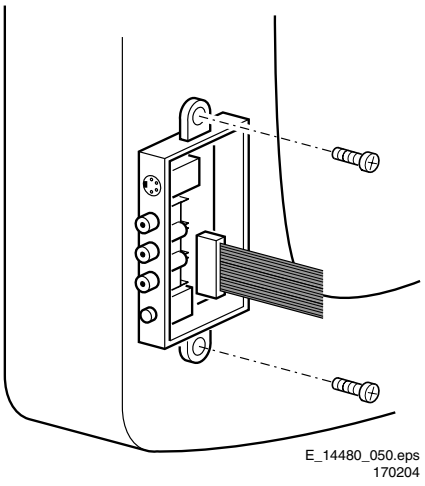


Figure 4-3 Side AV assy/panel removal

1. Remove the two fixation screws, and remove the complete Side AV assembly.
2. Release the two fixation clamps, and lift the panel out of the bracket.

4.3.3 LTI/CTI Interface Panel Removal

Remove the LTI/CTI Interface panel from the Mono Carrier, by disconnecting it from connector 1212.

4.3.4 Top Control Assy/Panel Removal

Notes:
- PV02 styling: assy is mounted in the front cabinet;
- FL13B styling: assy is mounted in the rear cover.

1. Remove the two fixation screws.
2. Push the assy a little bit upwards, and then pull it backwards to release it from the front hinge.
3. Lift the panel from its bracket, while releasing the four fixation clamps.

4.3.5 Linearity Assy/Panel Removal

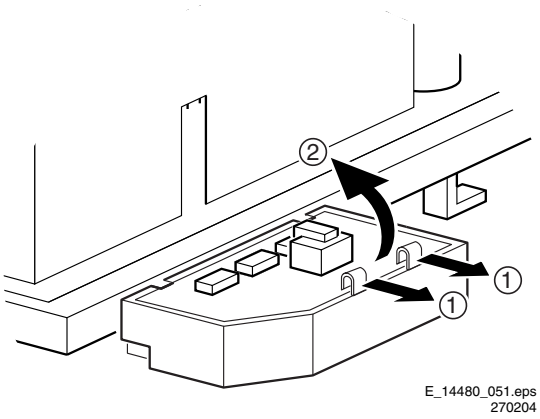


Figure 4-4 Linearity assy/panel removal

1. Release the two fixation clamps [1] to lift the panel out of the bracket [2].

4.3.6 Interface Module Removal

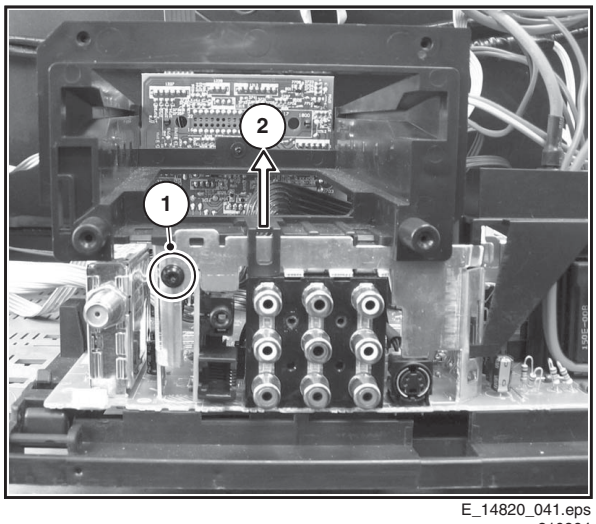


Figure 4-5 Interface Module Removal

1. Unscrew the fixation srew [1].
2. Lift the fixation clamp [2] to release the bracket.

4.3.7 PIP Assy/Panel Removal

1. Release the two fixation clamps to lift the panel out of the bracket.

4.4 Set Re-assembly

To re-assemble the whole set, do all processes in reverse order.

Note: before you mount the rear cover, perform the following checks:
1. Check whether the Mains cord is mounted correctly in its guiding brackets.
2. Check whether all cables are replaced in their original position

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points
5.2 Service Modes
5.3 Problems and Solving Tips Related to CSM
5.4 Service Tools
5.5 Error Codes
5.6 The Blinking LED Procedure
5.7 Protections
5.8 Fault Finding and Repair Tips

5.1 Test Points

This chassis is equipped with test points in the service printing. In the schematics test points are identified with a rectangle box around Fxxx or Ixxx. These test points are specifically mentioned in the “Test Point Overview” as “half moons” with a dot in the center.

Table 5-1 Test point overview

Test point	Circuit	Diagr.
F508, F535, F536, F537, F552, F561, F563, F573, F664, I513, I518, I519, I524, I531, I533, I546	Power supply	A1
F401, F412, F413, F414, F418, F452, F453, F455, F456, F458, F459, F460, F461, I408, I416, I417, I420, I462, I468	Line & Frame Deflection	A2
F003, F004, I001, I002	Tuner IF	A3
F201, F203, F205, F206	Hercules	A4
F240, F241, F242	Features & Connectivities	A5
F952, F955, I951, I952	Audio Amplifier	A7
F692	Front Control	A9
F331, F332, F333, F338, F339, F341, F351, F353, F354	CRT Panel	B1
F361, F362, F381, F382	ECO Scavem	B2

Perform measurements under the following conditions:
- Television set in Service Default Alignment Mode.
- Video input: Color bar signal.
- Audio input: 3 kHz left channel, 1 kHz right channel.

5.2 Service Modes

Service Default Alignment Mode (SDAM) offers several features for the service technician, while the Customer Service Mode (CSM) is used for communication between dealer and customer.

5.2.1 Service Default Alignment Mode (SDAM)

Purpose
- To change option settings.
- To create a predefined setting to get the same measurement results as given in this manual.
- To display / clear the error code buffer when leaving SDAM with “standby” key on remote control.
- To override SW protections.
- To perform alignments.
- To start the blinking LED procedure.

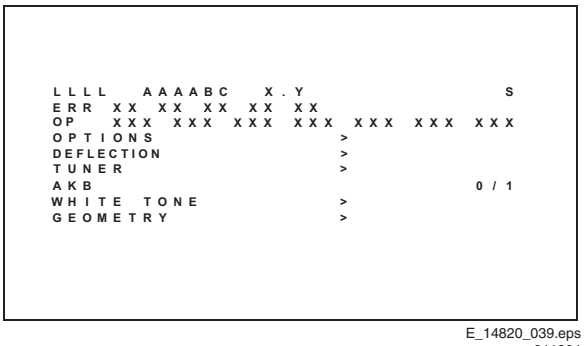
Specifications
- Tuning frequency:
  - For sets with PLL tuning AP-NTSC: Channel 3 is tuned (61.25 MHz).
  - For sets with PLL tuning AP-PAL: 475.25 MHz is tuned.
- Colour system:
  - For AP-NTSC: NTSC
  - For AP-PAL: PAL B/G
- All picture settings at 50 % (brightness, colour contrast, hue).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
  - (sleep) timer,
  - child/parental lock,
  - blue mute,
  - hotel/hospitality mode
  - auto switch-off (when no IDENT video signal is received for 15 minutes),
  - skip / blank of non-favourite presets / channels,
  - auto store of personal presets,
  - auto user menu time-out.
- Operation hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.

How to Enter SDAM

Use one of the following methods:
- Use a System 7 remote control type T374AH (RC-transmitter RG4172BK) and key in the code **‘062596’** directly followed by the **‘M’** (menu) button or
- Short circuit jumper wires 9252 and 9275 on the mono carrier (see Fig. 8-1) and apply Mains. Then press the power button (remove the short circuit after start-up).

Caution: Entering SDAM by short circuiting wires 9252 and 9275 will override the +5V-protection. Do this only for a short period. When doing this, the service-technician must know exactly what he is doing, as it could lead to damaging the set.

After activating SDAM, the following screen is visible, with S at the upper right side for recognition.



E_14820_039.eps
011204

Figure 5-1 SDAM Menu

1. **LLLL** This is the operation hours counter. It counts the normal operation hours, not the standby hours.
2. **AAAABC-X.Y** This is the software identification of the main micro controller:
   - A = the project name (L04H).
   - B = the region: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM.
   - C = the feature and language
   - X = the main software version number.
   - Y = the sub software version number.
3. **S** Indication of the actual mode. S= SDAM= Service Default Alignment mode.
4. **Error buffer** Five errors possible.
5. **Option bytes** Seven codes possible.
6. **Clear** Erases the contents of the error buffer. Select the CLEAR menu item and press the MENU RIGHT key. The content of the error buffer is cleared
7. **ISP Mode**Can be used to switch on the television to ISP mode (for uploading software

8. **Options** To set the Option Bytes. See chapter 8.3.1 for a detailed description.
9. **Tuner**
   To align the Tuner. See chapter 8.3.3 for a detailed description.
10. **White Tone**
    To align the White Tone. See chapter 8.3.4 for a detailed description.
11. **Geometry**
    To align the Geometry. See chapter 8.3.5 for a detailed description.

How to navigate
Use one of the following methods:
- In SDAM, select menu items with the CURSOR UP/DOWN key on the remote control transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the CURSOR UP/DOWN key to display the next / previous menu items.
- With the CURSOR LEFT/RIGHT keys, it is possible to:
  – Activate the selected menu item.
  – Change the value of the selected menu item.
  – Activate the selected submenu.
- When you press the MENU key in a submenu, you will return to the previous menu.

How to store settings
To store settings first go back to the main menu (fig. 5-1) with "MENU" button on the remote control and leave the SDAM with the "STANDBY" button on the remote control.

How to exit
Switch the set to STANDBY by pressing the power button on the remote control transmitter. The error buffer is cleared. (If you switch the set 'off' by removing the Mains, the set will return in SDAM when the Mains is re-applied and the error buffer will not be cleared.)

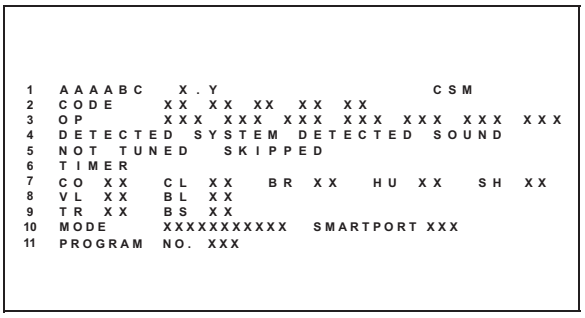
5.2.2 Customer Service Mode (CSM)

Purpose
When a customer is having problems with his TV-set, he can call his dealer. The service technician can than ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severness of the complaint. In a lot of cases he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer.
The CSM is a read only mode, therefore modifications in this mode are not possible.

How to Enter
To enter the CSM by pressing RECALL on the System 7 remote control RG4172BK.

After switching ON the Customer Service Mode, the following screen will appear:

CSM Menu


1 AAAABC X.Y CSM
2 CODE XX XX XX XX XX
3 OP XXX XXX XXX XXX XXX XXX XXX
4 DETECTED SYSTEM DETECTED SOUND
5 NOT TUNED SKIPPED
6 TIMER
7 CO XX CL XX BR XX HU XX SH XX
8 VL XX BL XX
9 TR XX BS XX
10 MODE XXXXXXXXXXX SMARTPORT XXX
11 PROGRAM NO. XXX

E_14820_040.eps
011204

Figure 5-2

1. Software identification of the main micro controller (see previous paragraph for an explanation).
2. Error code buffer (see paragraph Error Codes for more details). Displays the last five errors of the error code buffer.
3. In this line, the Option Bytes (OB) are visible. Each Option Byte is displayed as a decimal number between 0 and 255. The set may not work correctly when an incorrect option code is set. See chapter 8.3.1 for more information on the option settings.
4. Indicates which color and sound system is installed for the selected pre-set.
5. Indicates if the set is not receiving an IDENT signal on the selected source. It will display NOT TUNED.
6. Indicates if the sleep timer is enabled.
7. Value indicates parameter levels at CSM entry.
   CO= CONTRAST, CL= COLOR, BR= BRIGHTNESS, HU= HUE, SH= SHARPNESS
8. Value indicates parameter levels at CSM entry.
   VL= VOLUME LEVEL, BL= BALANCE LEVEL
9. Value indicates parameter levels at CSM entry (only for stereo sets).
   TR= TREBLE, BS= BASS
10. Mode Commercial = Hotel / Institutional mode or mode Consumer. Smartport. Indicates whether the Smart Port is selected or not.
11. Program NO. TV. Indicates to what channel the TV is tuned.

How to Exit
Use one of the following methods:
- Press any button of the remote control transmitter keys.
- Press RECALL on a System 7 remote control (the RC-transmitter RG4172BK).
- Switch-off the TV set with the Mains switch.

5.3 Problems and Solving Tips Related to CSM

5.3.1 Picture Problems

Note: The problems described below are all related to the TV settings. The procedures used to change the value (or status) of the different settings are described.

Picture too Dark or too Bright

If:
- The picture improves when you have press the AUTO PICTURE button on the remote control transmitter, or
- The picture improves when you enter the Customer Service Mode,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.

2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys (if necessary) to select BRIGHTNESS.
6. Press the MENU LEFT/RIGHT keys to increase or decrease the BRIGHTNESS value.
7. Use the MENU UP/DOWN keys to select PICTURE.
8. Press the MENU LEFT/RIGHT keys to increase or decrease the PICTURE value.
9. Press the MENU button on the remote control transmitter twice to exit the user menu.
10. The new PERSONAL preference values are automatically stored.

White Line around Picture Elements and Text

If:
The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select SHARPNESS.
6. Press the MENU LEFT key to decrease the SHARPNESS value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Snowy Picture
Check CSM line 6. If this line reads “Not Tuned”, check the following:
- Antenna not connected. Connect the antenna.
- No antenna signal or bad antenna signal. Connect a proper antenna signal.
- The tuner is faulty (in this case line 2, the Error Buffer line, will contain error number 10). Check the tuner and replace/ repair the tuner if necessary.

Black and White Picture

If:
- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select COLOR.
6. Press the MENU RIGHT key to increase the COLOR value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

Menu Text not Sharp Enough

If:
- The picture improves after you have pressed the AUTO PICTURE button on the remote control transmitter,

Then:
1. Press the AUTO PICTURE button on the remote control transmitter repeatedly (if necessary) to choose PERSONAL picture mode.
2. Press the MENU button on the remote control transmitter. This brings up the normal user menu.
3. In the normal user menu, use the MENU UP/DOWN keys to highlight the PICTURE sub menu.
4. Press the MENU LEFT/RIGHT keys to enter the PICTURE sub menu.
5. Use the MENU UP/DOWN keys to select PICTURE.
6. Press the MENU LEFT key to decrease the PICTURE value.
7. Press the MENU button on the remote control transmitter twice to exit the user menu.
8. The new PERSONAL preference value is automatically stored.

5.4 Service Tools

5.4.1 ComPair

Introduction
ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:
1. ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
2. ComPair allows very detailed diagnostics (on I^2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I^2C commands yourself because ComPair takes care of this.
3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the Force/SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

Specifications
ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial (or RS-232) cable.
For this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector(s).

The ComPair fault finding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:
- Automatically (by communicating with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I^2C/UART level. ComPair can access the I^2C/UART bus of the television. ComPair can send and receive I^2C/UART commands to the microcontroller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I^2C/UART buses of the TV-set.

- Manually (by asking questions to you): Automatic diagnosis is only possible if the microcontroller of the television is working correctly and only to a certain extent. When this is not the case, ComPair will guide you through the fault finding tree by asking you questions *(e.g. Does the screen give a picture? Click on the correct answer: YES / NO)* and showing you examples *(e.g. Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope)*. You can answer by clicking on a link *(e.g. text or a waveform picture)* that will bring you to the next step in the fault finding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

How To Connect
This is described in the chassis fault finding database in ComPair.

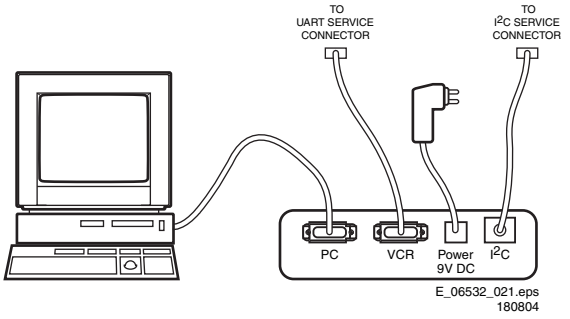


Figure 5-3 ComPair interface connection

How To Order
- ComPair order codes (EU/AP/LATAM):
- Starter kit ComPair32/SearchMan32 software and ComPair interface (excl. transformer): 3122 785 90450.
- ComPair interface (excl. transformer): 4822 727 21631.
- Starter kit ComPair32 software (registration version): 3122 785 60040.
- Starter kit SearchMan32 software: 3122 785 60050.
- ComPair32 CD (update): 3122 785 60070 (year 2002), 3122 785 60110 (year 2003 onwards).
- SearchMan32 CD (update): 3122 785 60080 (year 2002), 3122 785 60120 (year 2003), 3122 785 60130 (year 2004).
- ComPair firmware upgrade IC: 3122 785 90510.
- Transformer (non-UK): 4822 727 21632.
- Transformer (UK): 4822 727 21633.
- ComPair interface cable: 3122 785 90004.
- ComPair interface extension cable: 3139 131 03791.
- ComPair UART interface cable: 3122 785 90630.

Note: If you encounter any problems, contact your local support desk.

5.4.2 LVDS Tool

Introduction
This service tool (also called “ComPair Assistant 1“) may help you to identify, in case the TV does not show any picture, whether the Small Signal Board (SSB) **or** the display of a Flat TV is defective.
Furthermore it is possible to program EPLDs with this tool (Byte blaster). Read the user manual for an explanation of this feature.

Since 2004, the LVDS output connectors in our Flat TV models are standardised (with some exceptions). With the two delivered LVDS interface cables (31p and 20p) you can cover most chassis (in special cases, an extra cable will be offered).

When operating, the tool will show a small (scaled) picture on a VGA monitor. Due to a limited memory capacity, it is not possible to increase the size when processing high-resolution LVDS signals (> 1280x960). Below this resolution, or when a DVI monitor is used, the displayed picture will be full size.

Generally this tool is intended to determine if the SSB is working or not. Thus to determine if LVDS, RGB, and sync signals are okay.

How to Connect
Connections are explained in the user manual, which is packed with the tool.

Note: To use the LVDS tool, you must have ComPair release 2004-1 (or later) on your PC (engine version >= 2.2.05).
For every TV type number and screen size, one must choose the proper settings via ComPair. The ComPair file will be updated regularly with new introduced chassis information.

How to Order
- LVDS tool (incl. two LVDS cables: 31p and 20p): 3122 785 90671.
- LVDS tool Service Manual: 3122 785 00810.
- LVDS cable 30p (for LC4.3): 3122 785 90820 (available soon).
- LVDS cable 41p -> 31p for HD PDPs (dual -> single LVDS): 3122 785 90830 (available soon).

5.5 Error Codes

The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.

5.5.1 How to Read the Error Buffer

You can read the error buffer in 3 ways:
- On screen via the SAM (if you have a picture). **Examples:**
  - ERROR: 0 0 0 0 0 : No errors detected
  - ERROR: 6 0 0 0 0 : Error code 6 is the last and only detected error
  - ERROR: 9 6 0 0 0 : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See “The Blinking LED Procedure”.
- Via ComPair.

5.5.2 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:
- By using the CLEAR command in the SAM menu:
  - To enter SAM, press the following key sequence on the remote control transmitter: “062596” directly followed by the OSD/STATUS button (do not allow the display to time out between entries while keying the sequence).
  - Make sure the menu item CLEAR is highlighted. Use the MENU UP/DOWN buttons, if necessary.
  - Press the MENU RIGHT button to clear the error buffer. The text on the right side of the “CLEAR” line will change from “CLEAR?” to “CLEARED”
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the Mains from the television set, the error buffer is not reset.

5.5.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error and not the actual cause of the problem (for example, a fault in the protection detection circuitry can also lead to a protection).

Error	Device	Error description	Check item	Diagram
0	Not applicable	No Error		
1	Not applicable	X-Ray/Over-voltage protection (US only)	2411, 2412, 2413, 6404, 6411, 6412	A2
2	Not applicable	High beam (BCI) protection	3404, 7405	A2
3	Not applicable	Vertical guard protection	3466, 7451, 7452, 7453, 7454	A2
4	Tuner	I2C error while communicating with 2nd tuner	1000, 5010, (PIP Module)	F2
5	Not applicable	+5v protection	7604, 7605	A5
6	I2C bus	General I2C error	7200, 3207, 3214	A4
7	Not applicable	-	-	-
8	Not applicable	-	-	-
9	24C16	I2C error while communicating with the EEPROM	7601, 3604, 3605	A5
10	Tuner	I2C error while communicating with the PLL tuner	1000, 5001	A3
11	TDA6107/A	Black current loop instability protection	7330, 3351, CRT	B1
12	SDA9488X	I2C error while communicating with the PIP processor	7242 (PIP Module)	F1
13	Not applicable	-	-	-
14	DVD Loader	I2C error while communicating with the DVD Interface module	DVD Interface module	DVD Loader
15	TDA9178T/N1	I2C error while communicating with LTI module	7610	H
16	TDA9887	I2C error while communicating with PIP_Demodulator	7201	F2
17	Not applicable	-	-	-
18	Not applicable	-	-	-
19	TDA1200x	I2C error while communicating with SSD stereo sound decoder	7200	A4
20	TDA1200x	I2C error while communicating with video cosmic in Hercules IC	7200	A4

5.6 The Blinking LED Procedure

Using this procedure, you can make the contents of the error buffer visible via the front LED. This is especially useful when there is no picture.

When the SDM is entered, the front LED will blink the contents of the error-buffer:
- When all the error-codes are displayed, the sequence finishes with a LED blink of 1.5 seconds,
- The sequence starts again.

Example of error buffer: **12 9 6 0 0**
After entering SDM, the following occurs:
- 1 long blink of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long blink of 1.5 seconds to finish the sequence,
- The sequence starts again at 12 short blinks.

5.7 Protections

If a fault situation is detected, an error code will be generated; and, if necessary, the television set will go into protection mode. Blinking of the red LED at a frequency of 3 Hz indicates the protection mode. In some error cases, the microprocessor does not put the set in protection mode. The error codes of the error buffer and the blinking LED procedure can be read via the Service Default Menu (SDM), or via ComPair.

To get a quick diagnosis the chassis has three service modes implemented:
- The Customer Service Mode (CSM).
- The Service Default Mode (SDM).
- The Service Alignment Mode (SAM).

For a detailed mode description, see the relevant sections.

5.8 Fault Finding and Repair Tips

Notes:
- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- Before any fault finding actions, check if the correct options are set.

5.8.1 NVM Editor

In some cases, it can be handy if one directly can change the NVM contents. This can be done with the “NVM Editor” in SAM mode.

5.8.2 Power Supply

Set Not Working

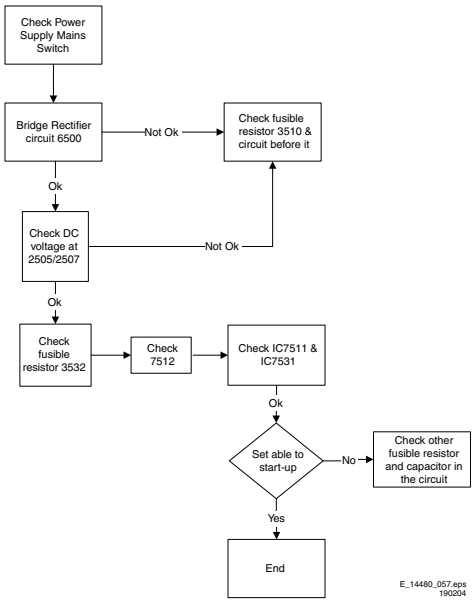


Figure 5-4 Fault finding tree “Set not working”

Set Does Not Start Up

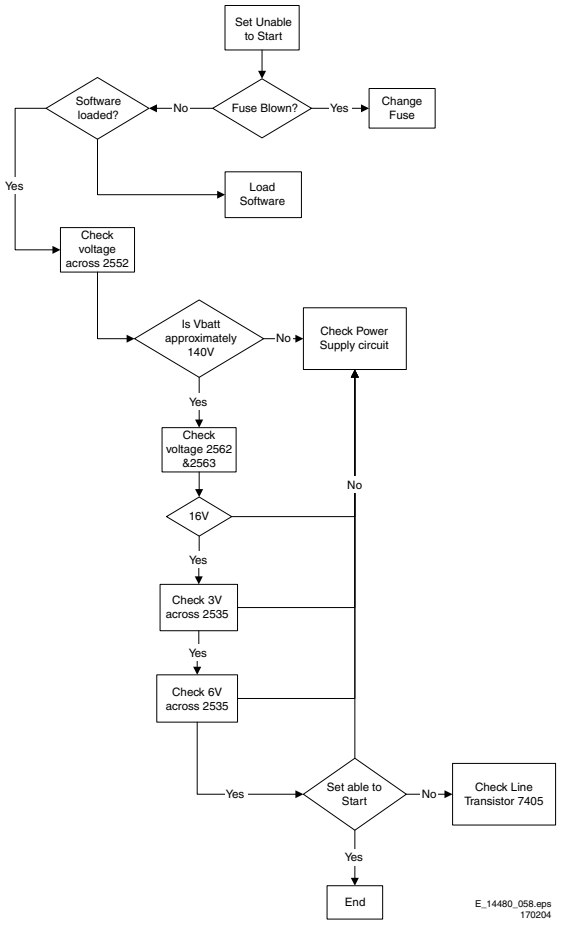


Figure 5-5 Fault finding tree "Set does not start up"

5.8.3 Deflection

One Thin Vertical Line

Quick check:

- Set in protection mode.
- LED blinking with error "3".

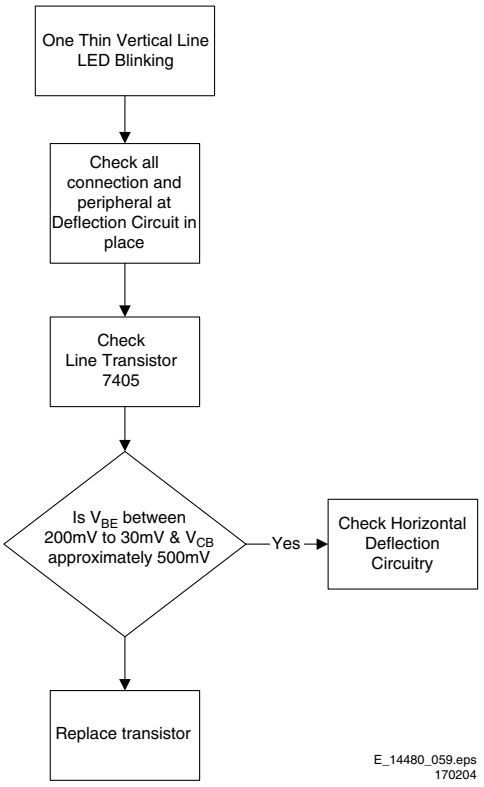

One Thin Vertical Line LED Blinking
Check all connection and peripheral at Deflection Circuit in place
Check Line Transistor 7405
Is V_{BE} between 200mV to 30mV & V_{CB} approximately 500mV
Yes
Check Horizontal Deflection Circuitry
Replace transistor
E_14480_059.eps
170204

Figure 5-6 Fault finding tree "One thin vertical line"

One Thin Horizontal Line

Quick check:

- Set in protection mode.
- LED blinking with error "2".

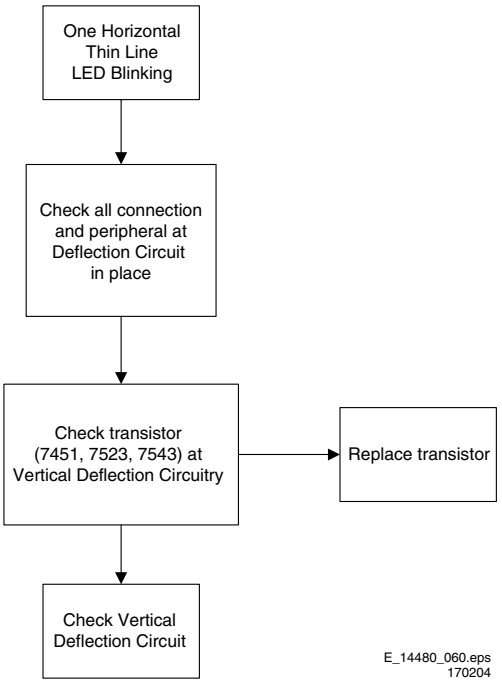

One Horizontal Thin Line LED Blinking
Check all connection and peripheral at Deflection Circuit in place
Check transistor (7451, 7523, 7543) at Vertical Deflection Circuitry
Replace transistor
Check Vertical Deflection Circuit
E_14480_060.eps
170204

Figure 5-7 Fault finding tree "One thin horizontal line"

Blank Screen

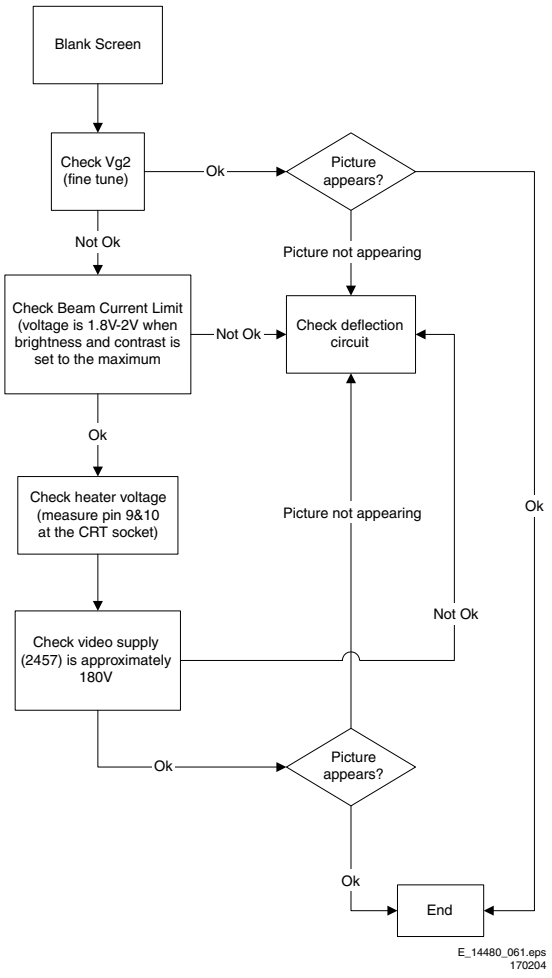


Figure 5-8 Fault finding tree "Blank screen"

5.8.4 Source Selection

Set is not able to go into av or any missing AV is encountered

E.g. AV1 is available but not able to enter to AV1: Check if the option setting is correct.

Set is able to go to AV, but no audio is heard.

1. Check that continuity of signal is there from the SCART/ Cinch input to the input of the Hercules.
2. If continuity is there and still no audio, check that option settings are correct.
3. If logic setting is correct and still no audio, proceed to Audio Decoder/Processor troubleshooting section.

Set is able to go into AV but no video is available:

1. Check continuity from AV input to HERCULES depending on the input.
2. If continuity is available and yet no video, proceed to Video Processor troubleshooting section.

5.8.5 Tuner and IF

No Picture

1. Check that the Option settings are correct.
2. If correct, check that supply voltages are there.
3. If supply voltages are present, check whether picture is present in AV.
4. If picture is present in AV, check with the scope the Tuner IF output signal by manual storage to a known channel.
5. If IF output is present, Tuner is working fine. If no IF output, I2C data lines may be open, check continuity of I2C lines. If I2C lines are ok, Tuner may be defect, replaced Tuner.
6. If Tuner IF is present and yet still no picture in RF mode, go to Video Processing troubleshooting section.

No Picture, No Sound

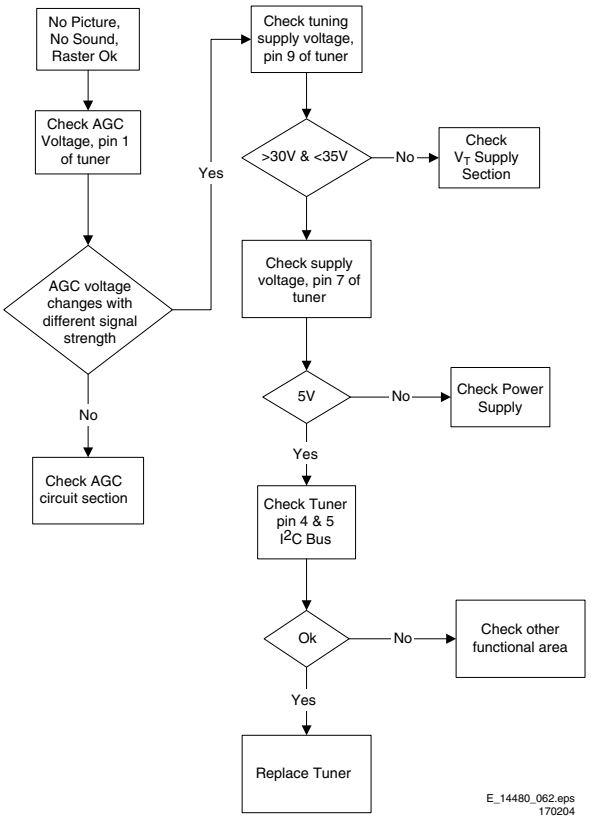


Figure 5-9 Fault finding tree "No picture, no sound"

Picture Ok, No Sound

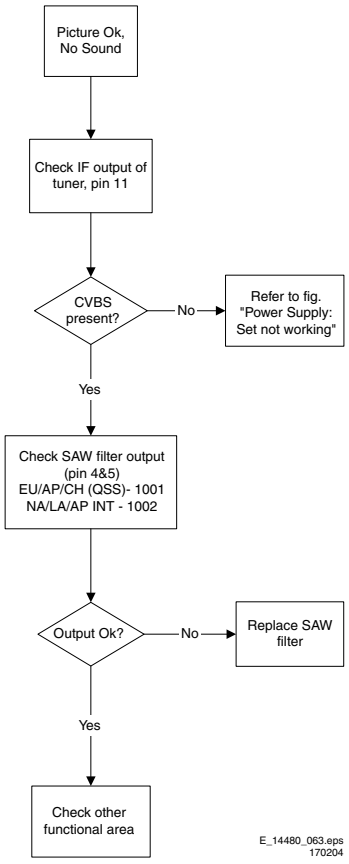


Figure 5-10 Fault finding tree "Picture ok, no sound"

Unable To Perform Tuning

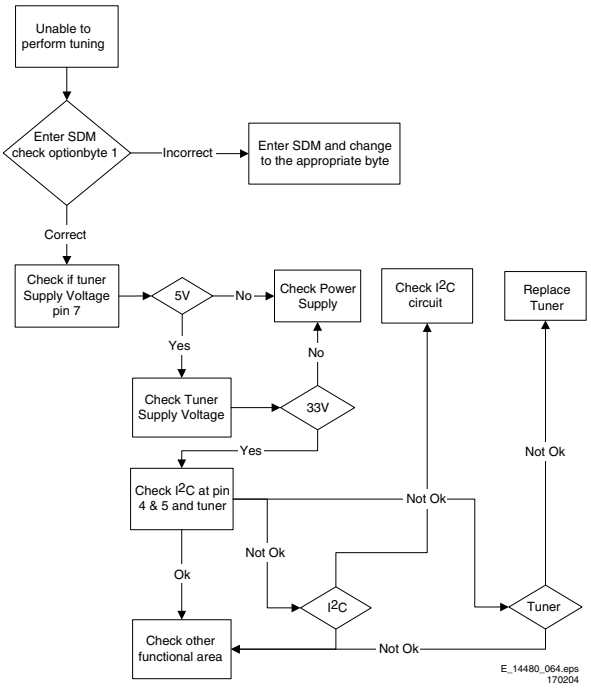


Figure 5-11 Fault finding tree "Unable to perform tuning"

5.8.6 Controller

Below are some guidelines for troubleshooting of the Micro Controller function. Normally Micro Controller should be checked when there is a problem of startup.

1. Check that both +3.3 V_dc and +1.8 V_dc are present.
2. Check that crystal oscillator is working.
3. Check that Power Good signal is at "high" logic, normal operation.
4. Check that HERCULES is not in standby mode. Pin 15 of HERCULES should be 0 V_dc.
5. Make sure H-drive pulse is there. This can be checked at resistor R3239. If H-drive does not exist, remove resistor R3239 to check if there is loading.

Note: When the set shuts down after a few second after power "on", the main cause is that Vg2 not aligned properly, try adjusting Vg2 during the few seconds of power "on".

5.8.7 Video Processing

No Picture

When "no picture in RF", first check if the microprocessor is functioning ok in section "Controller". If that is ok, follow the next steps.
When "no picture in AV", first check if the video source selection is functioning ok in section "Source Selection". If that is ok, follow the next steps.

1. Check that normal operating conditions are met.
2. Check that there is video signal at pin 81. If no video, demodulator part of the HERCULES is faulty, replace with new HERCULES.
3. If video signal is available at pin 81, check pin 56, 57, and 58 for the RGB signal.
4. If signal is not available, try checking the BRIGHTNESS and/or CONTRAST control, and make sure it is not at zero.
5. If still with the correct settings and no video is available, proceed to the CRT/RGB amplifier diagram.

For sets with TDA9178, follow steps below:

1. Put Option Byte 2 bit 4 to "0"; if video signal is not available, then check fault finding section "Controller", Section "Source Selection", and steps above.
2. If video is available but not correct, put Option Byte 2 bit 4 to "1", then check if LTI panel is present. If not, put LTI panel in the main chassis (connector 1221).
3. If LTI panel is in main chassis, check cable between LTI panel and main chassis (position is 1206). If it is connected, then the LTI panel is faulty, replace it.

For sets with Scavem, and Scavem does not work, follow steps below:

1. Check Scavem coil connector (position is 1361) if connected; if not, connect it.
2. If connected, check NVM "bit storage" byte 1 bit 7; if it is not "1", set it to "1".
3. If it is "1", then check the data of the NVM addresses as in the next table. If the data is not correct, then set these addresses to diagram values.
4. If it still not works, track Scavem output from pin64 of HERCULES to CRT panel.

Table 5-3 NVM default values for Scavem

Description	Address (dec)	Address (hex)	Value (hex)
SPR, WS	140	8C	00
VMA, SVM	141	8D	32
NVM_SOC_SMD	142	8E	03

5.8.8 Audio Processing

No Sound

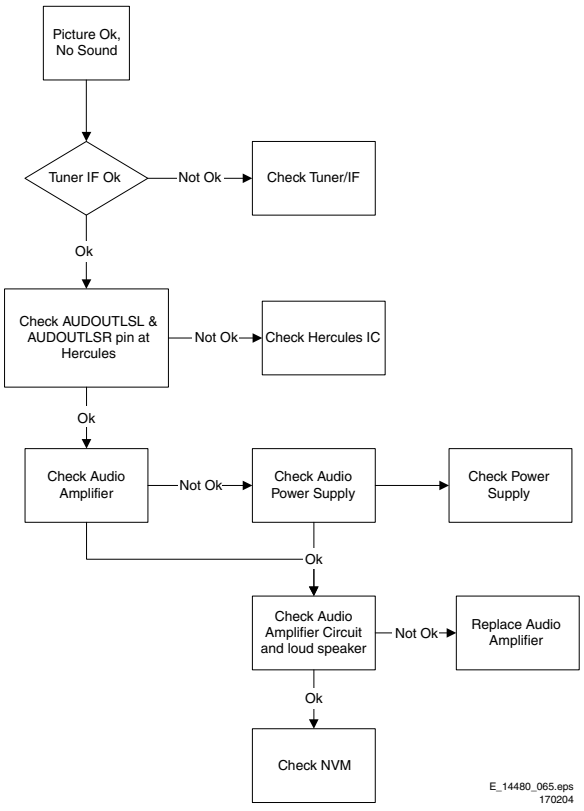


Figure 5-12 Fault finding tree "No sound"

No RF audio for QSS/Inter-Carrier stereo sets.

1. Check pin 99 and 100 for SIF signal (for QSS) or pin 104 and 105 for video with SIF (for Inter-Carrier)
2. If signal is not present, check for the QSS/FMI bit settings. Check also the NVM data.
3. If signals are present and still no audio, check the audio supply voltage +8V are present.
4. If still no audio signal at Hercules output, Hercules is faulty.

No AV audio.

1. Check troubleshooting methods in section "Source Selection".
2. Check the output of the Hercules to see if there is signal available. If no, check the normal operating condition and also the NVM data.
3. If still no audio signal at Hercules output, Hercules is faulty.

Note: If there is audio signal at Hercules output and no audio at loudspeaker, proceed to Audio Amplifier troubleshooting methods.

5.8.9 Audio Amplifier

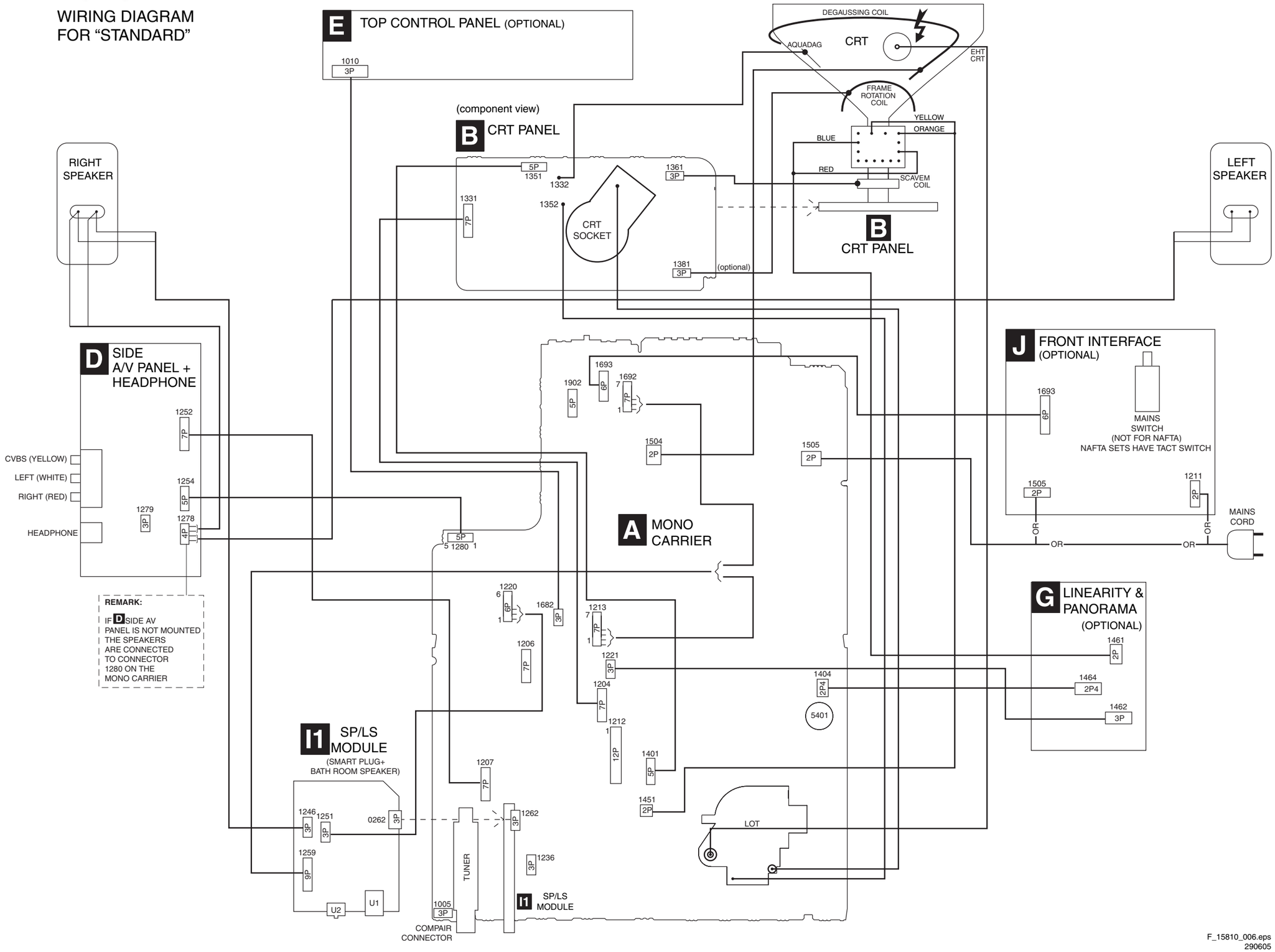
No RF as well as AV audio at the loudspeaker:

1. Check that the normal operation condition of the amplifier is met.
2. If normal operation conditions are met, check the continuity from Hercules output to input of the amplifier.
3. If continuity is there and still no audio, check speaker wire connections. If still no audio, amplifier IC might be faulty

6. Block Diagrams, Testpoint Overviews, and Waveforms

Wiring Diagram for Standard

WIRING DIAGRAM
FOR "STANDARD"



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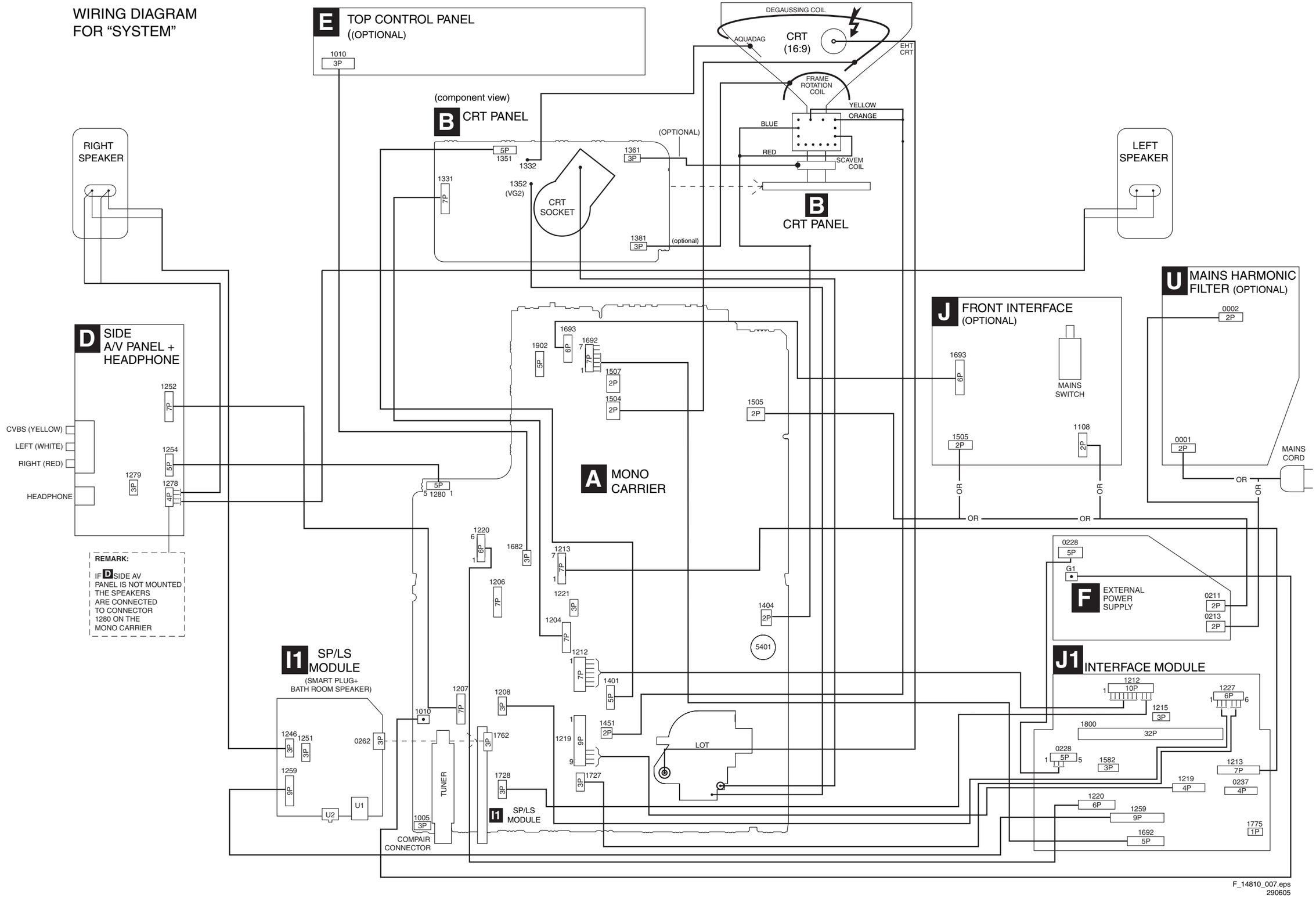
Wiring Diagram for System

WIRING DIAGRAM
FOR “SYSTEM”



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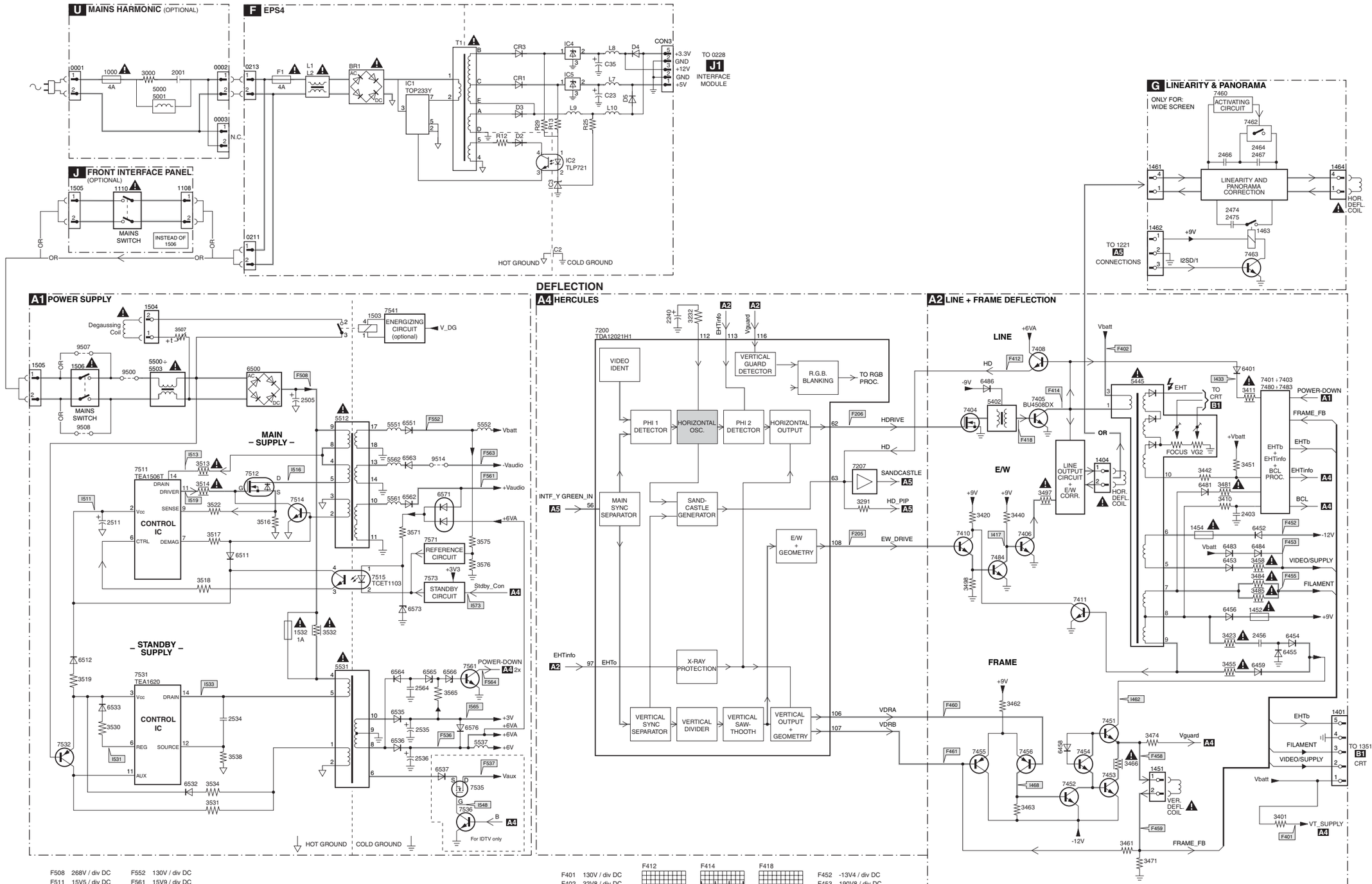
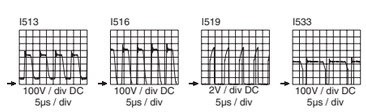
Block Diagram Supply and Deflection

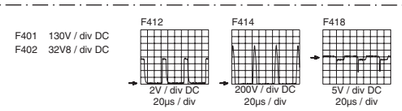
SUPPLY AND DEFLECTION

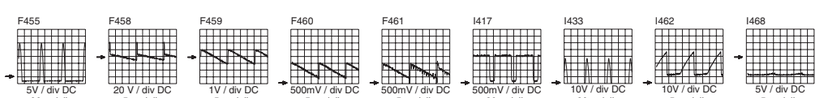


F508 268V / div DC
F511 15V5 / div DC
F531 2V7 / div DC
F537 0V (N.A.)
F552 130V / div DC
F561 15V9 / div DC
F564 9V4 / div DC
F573 0V (N.A.)



F401 130V / div DC
F402 32V8 / div DC
F452 -13V4 / div DC
F453 190V8 / div DC





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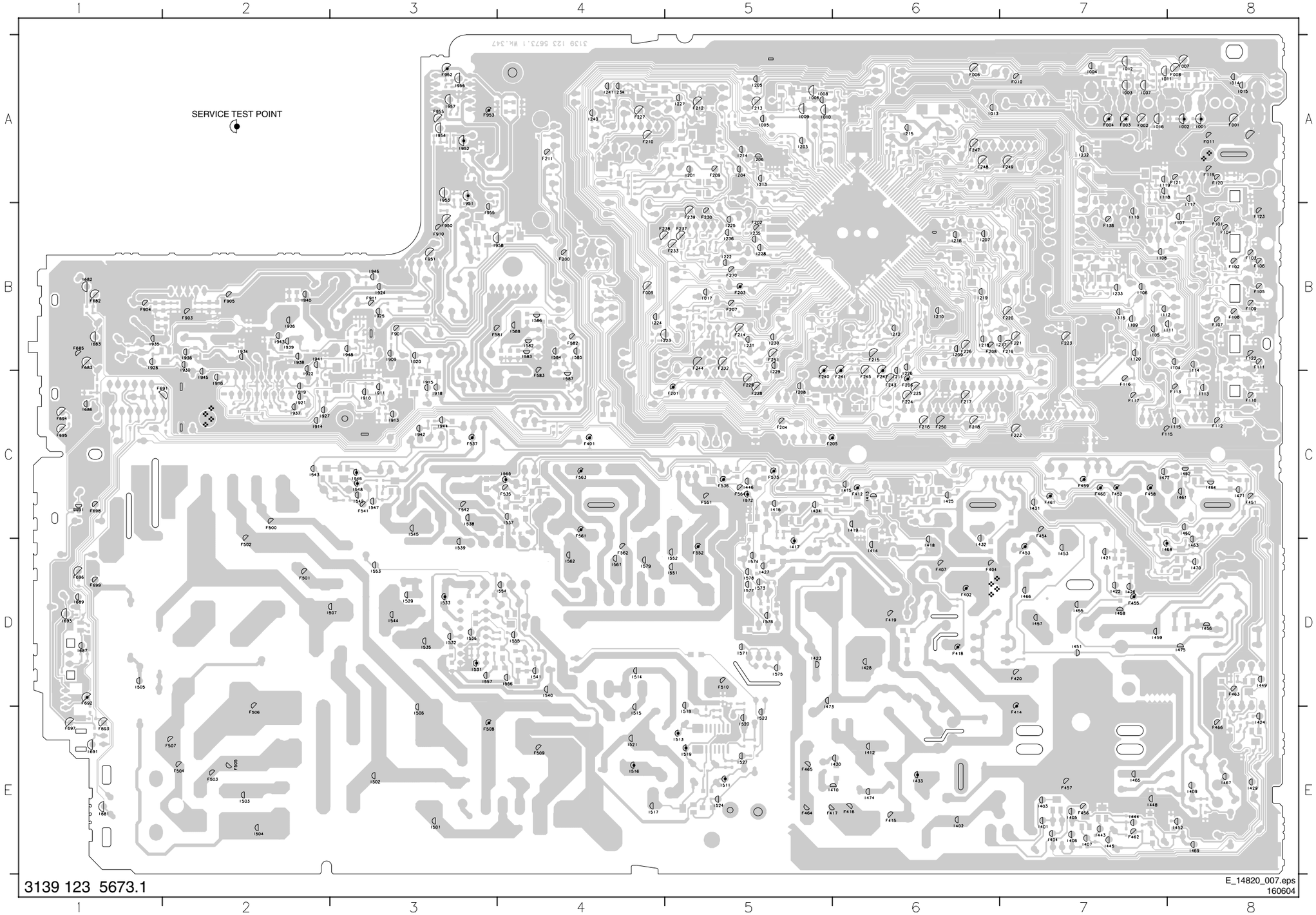
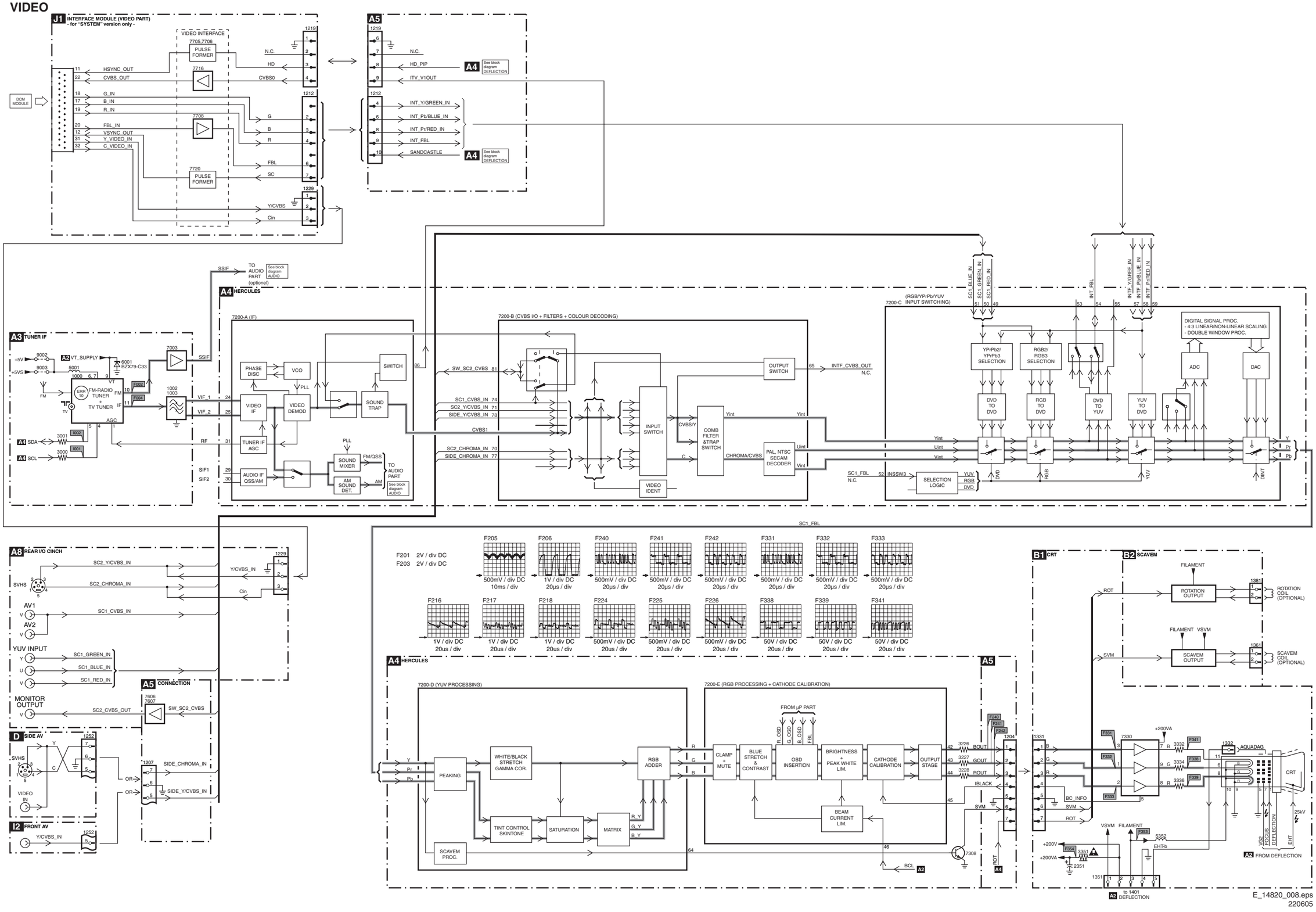
Testpoint Overview Mono Carrier

F001 A8 F002 A7 F003 A7 F004 A7 F005 A8 F006 A6 F007 A8 F008 A8 F009 B4 F010 A7 F011 A8 F101 B8 F102 B8 F103 B8 F104 B8 F105 B8 F106 B8 F107 B8 F108 B8 F109 B8 F110 C8 F111 B8 F112 C8 F113 C8 F115 C7 F116 C7 F117 C7 F119 A8 F120 A8 F121 A8 F122 B8 F123 B8 F138 B7 F200 B4 F201 C5 F202 B5 F203 B5 F204 C5 F205 C5 F206 C6 F207 B5 F208 B6 F209 A5 F210 A4 F211 A4 F212 A5 F213 A5 F214 B5 F215 B6 F216 C6 F217 C6 F218 C6 F219 B7 F220 B7 F221 B7 F222 C7 F223 B7 F224 C6 F225 C6 F226 B6 F227 A4 F228 C5 F229 C5 F230 B5 F232 B5 F233 B5 F237 B5 F238 B4 F239 B5 F240 C5 F241 C6 F242 C6 F243 C6 F244 B5 F245 C6 F247 A6 F248 A6 F249 A7 F250 C6 F251 B5 F270 B5 F401 C4 F402 D6 F404 D6 F407 D6 F412 C6 F414 E7 F415 E6 F416 E6 F417 E5 F418 D6 F419 D6 F420 D7 F451 C8 F452 C7 F453 D7 F454 C7 F455 D7 F456 E7 F457 E7 F458 C7 F459 C7 F460 C7 F461 C7 F462 E7 F463 D8 F464 E5 F465 E5 F466 E8 F500 C2 F501 D2 F502 D2 F503 E2 F504 E2 F505 E2 F506 E2 F507 E2 F508 E3 F509 E4 F510 D5 F535 C4 F536 C5 F537 C3 F538 C3 F539 C3 F541 C3 F542 C3 F543 C5 F545 B1 F551 C5 F552 D5 F561 C4 F562 D4 F563 C4 F564 C5 F573 C5 F574 C5 F575 C1 F577 C1 F578 C1 F581 B3 F582 B4 F583 C4 F590 B1 F683 B1 F685 B1 F691 B3 F692 B3 F693 B3 F694 C1 F695 C1 F696 D1 F697 E1 F698 C1 F699 D1 F901 B3 F902 B2 F903 B2 F904 B1 F905 B2 F910 B3 F911 B3 F950 B3 F951 B3 F952 A3 F953 A3 F955 A3 I001 A8 I002 A8 I003 A7 I004 A7 I005 A5 I006 A5 I007 A7 I008 A5 I009 A5 I010 A5 I011 A7 I012 A7 I013 A6 I014 A8 I015 A8 I016 A7 I017 B5 I104 B8 I105 B7 I106 B7 I107 B8 I108 B7 I109 B7 I110 B7 I111 B8 I112 B7 I113 C8 I114 B8 I115 C8 I116 B7 I117 B8 I118 A7 I119 A7 I120 B7 I121 B6 I201 A5 I202 A5 I203 A5 I204 A5 I205 A5 I206 B6 I207 B6 I208 C5 I209 B6 I210 B6 I211 C6 I212 B6 I213 A5 I214 A5 I215 A6 I216 B6 I217 B7 I218 B6 I219 B6 I220 B5 I222 B5 I223 B5 I224 B4 I225 B5 I226 C6 I227 A5 I228 B5 I229 C5 I230 B5 I231 B5 I232 A7 I233 B7 I234 A4 I235 B5 I236 B5 I240 A4 I241 A4 I247 E7 I248 D6 I249 D7 I401 E7 I402 E6 I403 E7 I404 E7 I405 E7 I406 E7 I407 E7 I408 E8 I409 E8 I410 E6 I411 C6 I412 E6 I413 C6 I414 D6 I415 C6 I416 C5 I417 D5 I418 D6 I419 C6 I420 D5 I421 D7 I422 D7 I423 D5 I424 E8 I425 C6 I426 D7 I427 D5 I428 D6 I429 E8 I430 E6 I431 C7 I432 D6 I433 E6 I434 C5 I435 D8 I436 D7 I437 D7 I438 D7 I439 D7 I440 D8 I441 C8 I442 C8 I443 E7 I444 E7 I445 E7 I446 C5 I448 E7 I449 D8 I451 D7 I452 E8 I453 D7 I454 D7 I455 D7 I456 D8 I457 D7 I458 D7 I459 D7 I460 C8 I461 C8 I462 C8 I463 D8 I464 C8 I465 E7 I466 D7 I467 E8 I468 D7 I469 E8 I470 D8 I471 C8 I472 C7 I473 E5 I474 E6 I475 D8 I501 E3 I502 E3 I503 E2 I504 E2 I505 D1 I506 E3 I507 D3 I511 E5 I513 E5 I514 D4 I515 E4 I516 E4 I517 E4 I518 E5 I519 E5 I520 E5 I521 E4 I523 E5 I524 E5 I527 E5 I529 D3 I531 D3 I532 D3 I533 D3 I535 D3 I536 D3 I537 C4 I538 C3 I539 D3 I540 D4 I541 D4 I542 C3 I543 C2 I544 D3 I545 C3 I546 C3 I547 C3 I548 C3 I551 D5 I552 D5 I553 D3 I554 D4 I555 D4 I556 D4 I557 D3 I561 D4 I562 D4 I565 C4 I571 D5 I572 C5 I573 D5 I574 D5 I575 D5 I576 D5 I577 D5 I578 D5 I579 D4 I582 B4 I583 B4 I584 B4 I585 B4 I586 B4 I587 C4 I588 B4 I681 E1 I682 B1 I683 B1 I686 C1 I687 D1 I688 C1 I689 D1 I691 E1 I693 D1 I909 B3 I910 C3 I911 C3 I913 C3 I914 C2 I915 C3 I916 C2 I918 C3 I919 C2 I920 B3 I921 C2 I922 C2 I924 B3 I925 B3 I926 B2 I927 C2 I928 B1 I930 B2 I934 B2 I935 B1 I936 B2 I937 C2 I938 B2 I939 B2 I940 B2 I941 B2 I942 C3 I943 B2 I944 C3 I945 C3 I946 B3 I948 B3 I950 B4 I951 B4 I952 A3 I953 A3 I954 A3 I955 B3 I956 A3 I957 A3 I958 B4



Block Diagram Video

VIDEO



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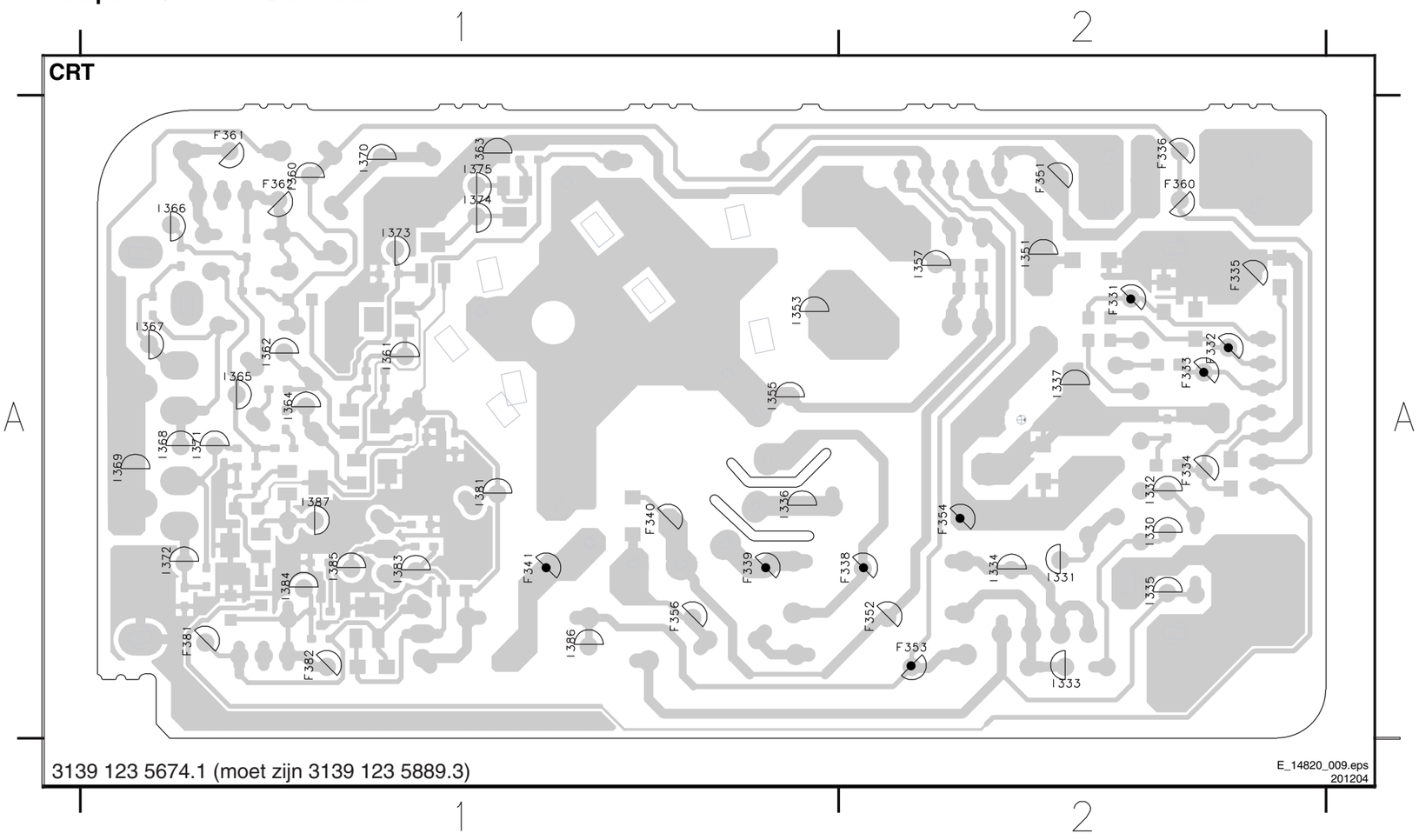
Testpoint Overview CRT Panel

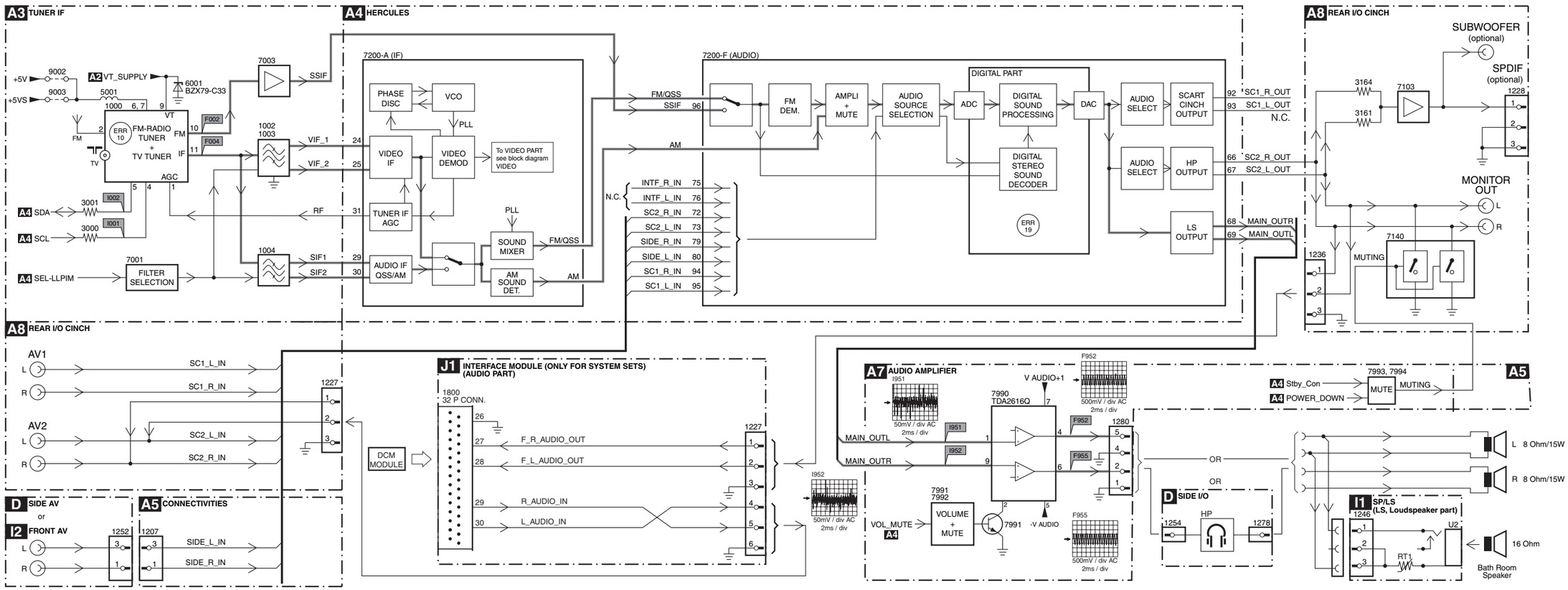


3139 123 5674.1 (moet zijn 3139 123 5889.3)

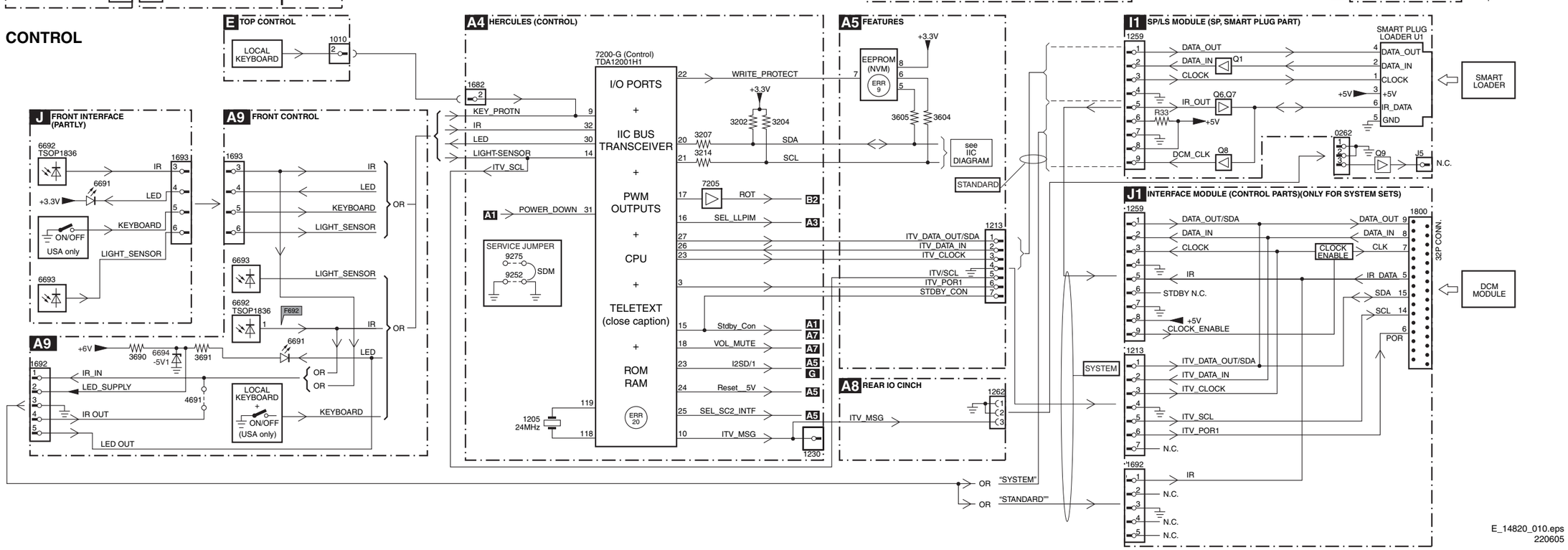
F331 A2
F332 A2
F333 A2
F334 A2
F335 A2
F336 A2
F338 A2
F339 A1
F340 A1
F341 A1
F351 A2
F352 A2
F353 A2
F354 A2
F356 A1
F360 A2
F361 A1
F362 A1
F381 A1
F382 A1
I330 A2
I331 A2
I332 A2
I333 A2
I334 A2
I335 A2
I336 A1
I337 A2
I351 A2
I353 A1
I355 A1
I357 A2
I360 A1
I361 A1
I362 A1
I363 A1
I364 A1
I365 A1
I366 A1
I367 A1
I368 A1
I369 A1
I370 A1
I371 A1
I372 A1
I373 A1
I374 A1
I375 A1
I381 A1
I383 A1
I384 A1
I385 A1
I386 A1
I387 A1

Block Diagram Audio/Control

AUDIO



CONTROL



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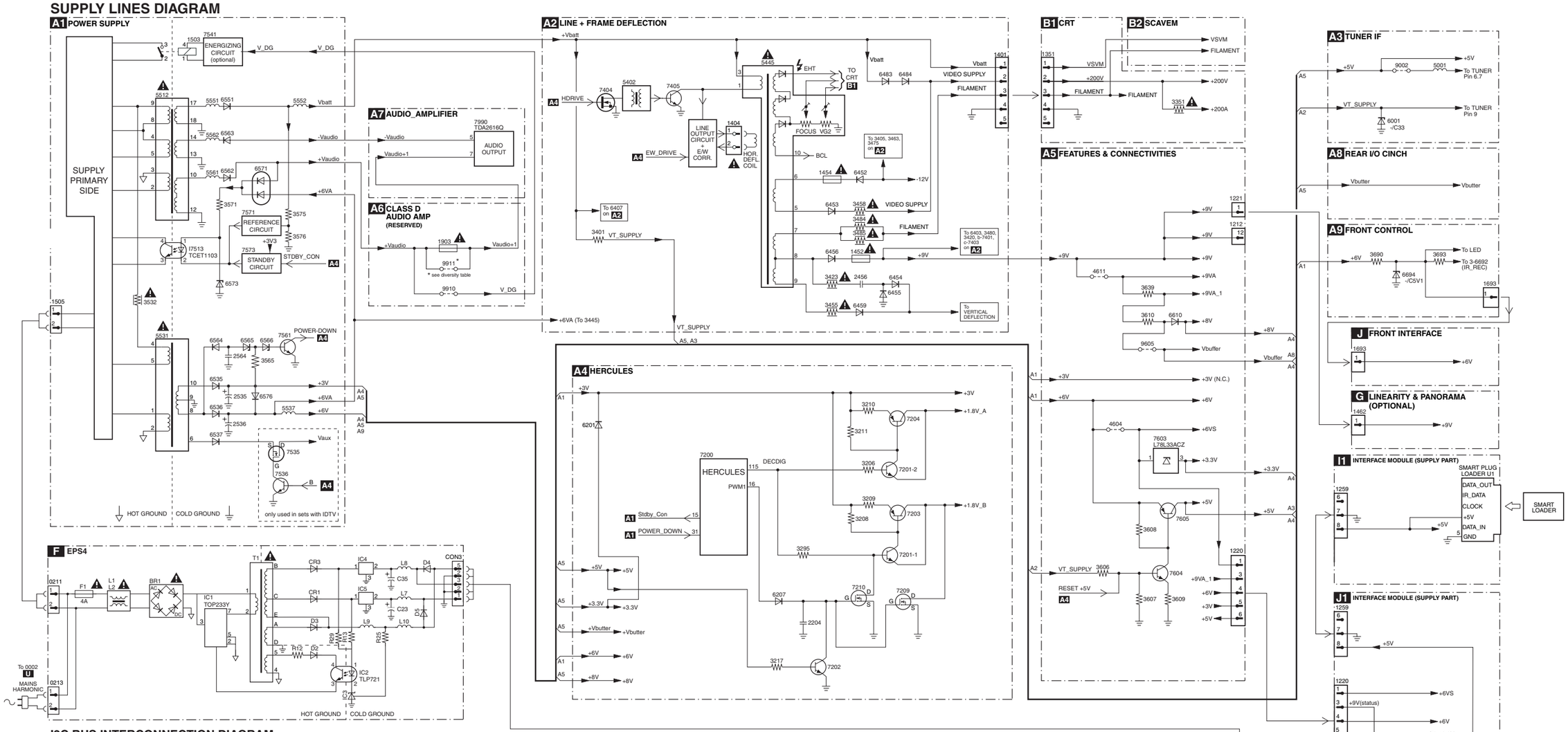
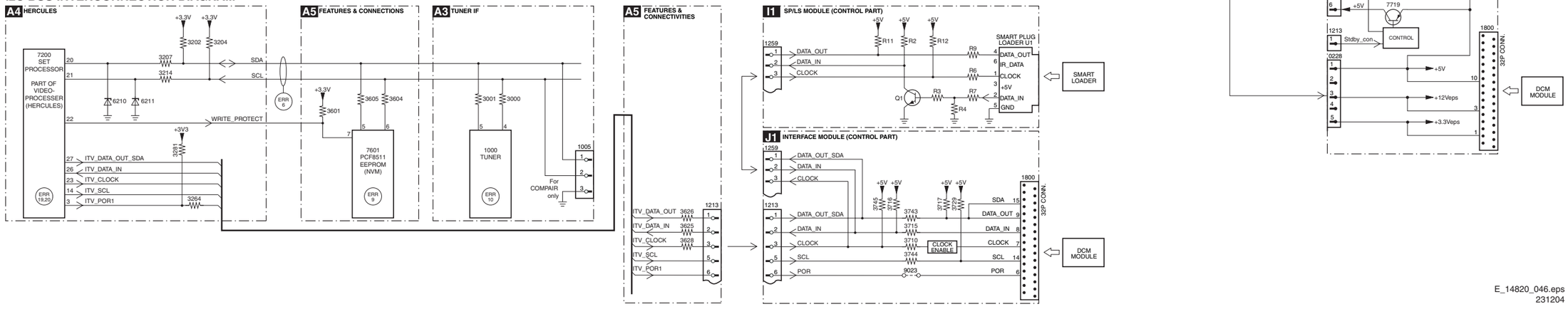
I2C and Supply Voltage Overview

SUPPLY LINES DIAGRAM



I2C BUS INTERCONNECTION DIAGRAM



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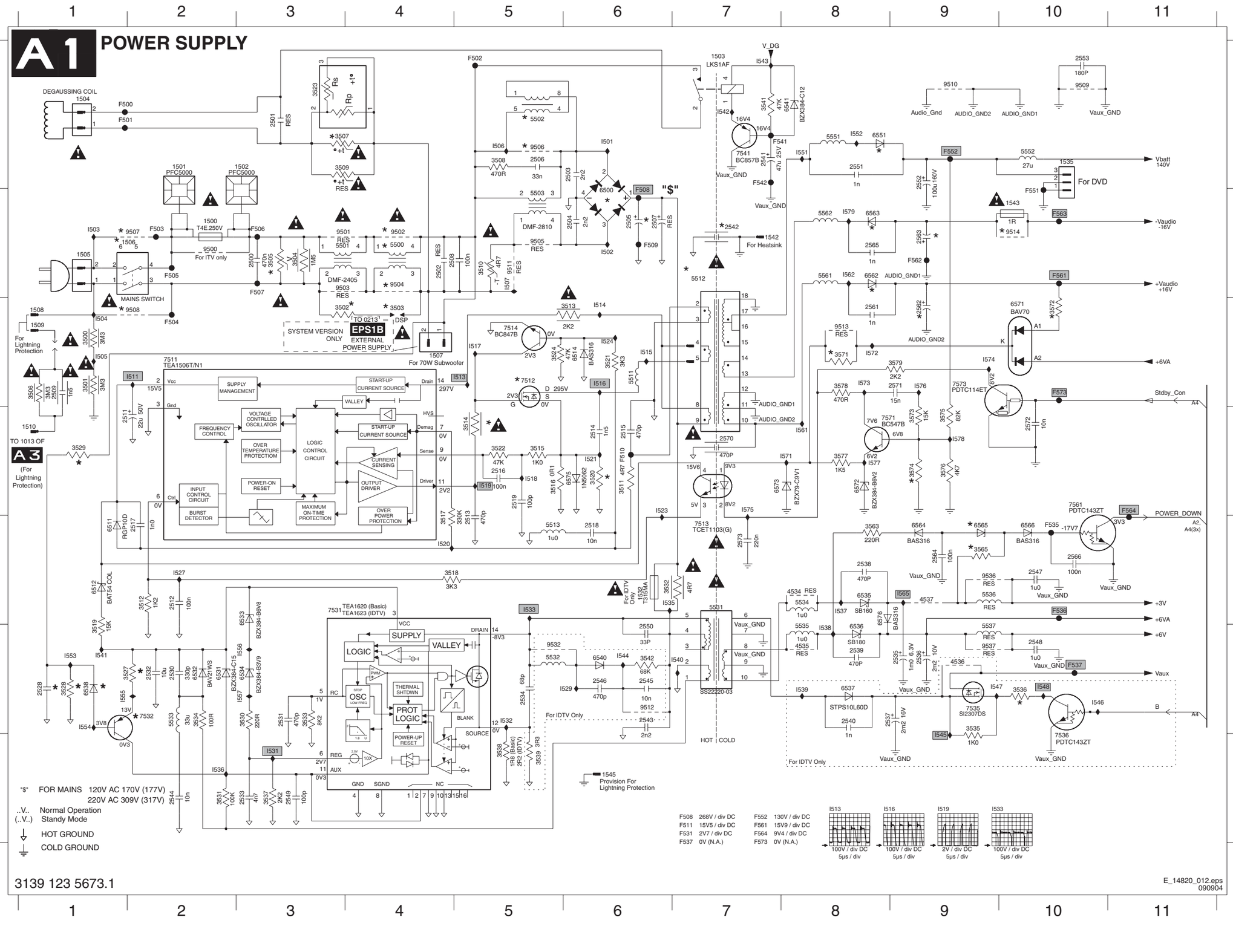
7. Circuit Diagrams and PWB Layouts

Mono Carrier: Power Supply



1500 B2 3578 C8 I523 D6
1501 A2 3579 C9 I524 C6
1502 A3 4534 E8 I527 E2
1503 A7 4535 F8 I529 F6
1504 A1 4536 F9 I531 G3
1505 B1 4537 E9 I532 F5
1506 B1 5500 B4 I533 E5
1507 C4 5501 B3 I535 E6
1508 C1 5502 A5 I536 G2
1509 C1 5503 B5 I537 E8
1510 D1 5511 C6 I538 F8
1532 E6 5512 B7 I539 F8
1535 A10 5513 E5 I540 F7
1542 B7 5531 E7 I541 F1
1543 B10 5532 F5 I542 A7
1545 G6 5533 F2 I543 A7
2500 B3 5534 E8 I544 F6
2501 A3 5535 F8 I545 G5
2502 B4 5536 E9 I546 F10
2503 A6 5537 F9 I547 F9
2504 B6 5551 A8 I548 F10
2505 B6 5552 A10 I551 A8
2506 A5 5561 B8 I552 A8
2507 B6 5562 B8 I553 F1
2508 B4 6500 A6 I554 F1
2509 C1 6511 E1 I555 F1
2511 D1 6512 E1 I556 F3
2512 E2 6514 C6 I557 F3
2513 E5 6531 F2 I561 D8
2514 D6 6532 F2 I562 B8
2515 D6 6533 E3 I565 E9
2516 D5 6534 F3 I571 D8
2517 E2 6535 E8 I572 C8
2518 E6 6536 F8 I573 C8
2519 D5 6537 F8 I574 C9
2528 F1 6538 F8 I575 D7
2530 F2 6540 F6 I576 C9
2531 F9 6541 A8 I577 D8
2532 F2 6551 A8 I578 D9
2533 G3 6562 B8 I579 B8
2534 F5 6563 B8
2535 F9 6564 E9
2536 F9 6565 E9
2537 F8 6566 E10
2538 E8 6571 C10
2539 F8 6572 D8
2540 F8 6573 D7
2541 A7 6575 D6
2542 B7 6576 E8
2543 F6 7511 C2
2544 G2 7512 C5
2545 F6 7513 E7
2546 F6 7514 C5
2547 E10 7531 E3
2548 F10 7532 F2
2549 G3 7535 F9
2550 F6 7536 G10
2551 A8 7541 A7
2552 A9 7561 D10
2553 A10 7571 D9
2561 C8 7573 C9
2562 C9 9500 B2
2563 B9 9501 B3
2564 E9 9502 B4
2565 B8 9503 B3
2566 E10 9504 B4
2570 D7 9505 B5
2571 C9 9506 A5
2572 D10 9507 B2
2573 E7 9508 C2
3500 C1 9509 A10
3501 C1 9510 A9
3502 C3 9511 B5
3503 C4 9512 F6
3504 B3 9513 C8
3505 B3 9514 B10
3506 C1 9532 F5
3507 A3 9536 E9
3508 A5 9537 F9
3509 A3 F500 A1
3510 B5 F501 A1
3511 D6 F502 A5
3512 E2 F503 B2
3513 C6 F504 C2
3514 D5 F505 B2
3515 D5 F506 B3
3516 D5 F507 B3
3517 E4 F508 B6
3518 E4 F509 B6
3519 F1 F510 D6
3520 D6 F535 E10
3521 C6 F536 E10
3522 D5 F537 F10
3523 A3 F541 A7
3524 C5 F542 A7
3527 F2 F551 B10
3528 F1 F552 A9
3529 D1 F561 B10
3530 F3 F562 B9
3531 G2 F563 B10
3532 E6 F564 D11
3533 F3 F573 C10
3534 F2 I501 A6
3535 F9 I502 B6
3536 F10 I503 B1
3537 G3 I504 C1
3538 G5 I505 C1
3539 G5 I506 A5
3541 A7 I507 B5
3542 F6 I511 C2
3563 E8 I513 C5
3565 E9 I514 C6
3571 C8 I515 C6
3572 C10 I516 C6
3573 D9 I517 C5
3574 D9 I518 D5
3575 D9 I519 D5
3576 D9 I520 E4
3577 D8 I521 D6

Mono Carrier: Diversity Table for A1

DIVERSITY TABLE FOR A 1 POWER SUPPLY

REGION	NAFTA			LATAM / AP						CHINA			INDIA		EUROPE					
MAIN RANGE	LR			FR						HR			HR		HR					
SET	27RF 27FSQ	32RF	26WSRF 30WSRF 32FSQ	21RF	25RF 29FSQ	29RF	29RF	28WSSF	28WSRF 32WSRF	21/25RF	29RF	34RF	21/29RF	21/29RF 29FSQ	21RF	29RF 28WSSF	29RF	24WR 25/28BLD	28WSRF	32WSRF
VBATT	130V	130V	143V	130V	130V	130V	130V	143V	143V	130V	130V	130V	130V	130V	130V	130V	130V	143V	143V	143V
AUDIO OUTPUT	2X5W 2X10W	2X5W 2X10W	2X5W 2X10W	2X10W	2X5W 2X10W	2X5W	2X10W	2X5W	2X10W	2X10W	2X5W 2X10W	2X10W	2X5W 2X10+20W	2X15W	2X5W 2X10W	2X5W	2X10W	2X5W 2X10W	2X5W 2X10W	2X5W 2X10W
1508	---	---	---	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK	WIRE SIN 180 SIN 18ST BK
1510	---	---	---	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK	WIRE SIN 400 SIN 18ST BK
2505	200V 470U	200V 470U	200V 470U	400V 330U	400V 330U	---	400V 330U	---	400V 330U	450V 220U	450V 220U 400V 33N	450V 220U 400V 33N	450V 220U	450V 220U	400V 220U	400V 220U	400V 220U	400V 220U	400V 220U	400V 220U
2506	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2508	---	---	---	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N	---	---	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N	275V 100N
2509	---	---	---	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5	250V 1N5
2528	---	---	---	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N	470N
2542	250V 1N5	250V 1N5	250V 1N5	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N	250V 1N
2570	---	---	---	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P	250V 470P
3505	1MA/423V	1MA/423V	1MA/423V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V	1MA/612V
3506	---	---	---	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3	3M3
3507	---	144V 3R	144V 3R	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3508	---	---	---	---	---	---	---	---	---	---	470R	470R	---	---	---	---	470R	---	470R	470R
3514	100R	100R	100R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R	47R
3520	0R18	0R18	0R18	0R33	0R33	0R33	0R22	0R33	0R22	0R33	0R33	0R33	0R33	0R33	0R33	0R33	0R33	0R33	0R33	0R33
3527	---	---	---	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K	47K
3528	---	---	---	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M	1M
3529	---	---	---	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2	2M2
3523	145V 1R5	---	---	276V 4R5	276V 4R5	276V4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5	276V 4R5
3565	15K	15K	15K	18K	18K	18K	18K	18K	18K	15K	15K	15K	15K	15K	15K	15K	15K	15K	15K	15K
3574	150K	150K	33K	150K	150K	150K	150K	33K	33K	150K	150K	150K	150K	150K	150K	150K	150K	33K	33K	33K
5500	---	---	---	10MH 2A	10MH 2A	10MH 2A	10MH 2A	10MH 2A	10MH 2A	20MH 1A5	20MH 1A5 65MH	20MH 1A5 65MH	---	---	20MH 1A5	20MH 1A5	20MH 1A5 65MH	20MH 1A5	20MH 1A5 65MH	20MH 1A5 38MH
5502	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5512	SS40310-01	SS40310-01	SS40312-01	SS42315-01	SS42315-01	SS42315-01	SS49309-01	SS42316-01	SS49308-01	SS42315-01	SS42315-01	SS42315-01 BYV29X-500	SS42315-01	SS42317-01	SS42315-01	SS42315-01	SS42315-01	SS42316-01	SS42316-01	SS42316-01
6500	GBU4JL	GBU6JL	GBU6JL	GBU4JL	GBU4JL	GBU6JL	GBU6JL	GBU6JL	GBU6JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL	GBU4JL
6538	---	---	---	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316	BAS316
6551	STTH8L06D	BYV29X-500	BYV29X-500	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	BYV29X-500	STTH8L06D	STTH8L06D	GBU4JL	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	STTH8L06D	BYV29X-500
6565	UDZS9.1B	UDZS9.1B	UDZS9.1B	UDZS7.5B	UDZS7.5B	UDZS7.5B	UDZS7.5B	UDZS7.5B	UDZS7.5B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B	UDZS10B
7512	FQPF9N50	FQPF9N50	FQPF9N50	FQPF7N80	STP10NK8OZFP	STP10NK8OZFP	STP10NK8OZFP	STP10NK8OZFP	STP10NK8OZFP	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80	FQPF7N80
7532	---	---	---	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B	BC857B
9502	JMP	JMP	JMP	---	---	---	---	---	---	---	---	---	JMP	JMP	---	---	---	---	---	---
9504	JMP	JMP	JMP	---	---	---	---	---	---	---	---	---	JMP	JMP	---	---	---	---	---	---
9506	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	JMP	---	---	JMP	JMP	JMP	JMP	---	JMP	---	---

AUDIO OUTPUT	2X5W	2X10W	2X10+20W	2X15W
1543	---	---	2A 250V	2A250V
2562	25V 1000uF	25V 2200uF	25V 2200uF	25V 2200uF
2563	25V 1000uF	25V 2200uF	25V 2200uF	25V 2200uF
3571	220R	220R	220R	680R
3572	220R	220R	220R	470R
6562	SB360	SB360	SB360	SB380
6563	SB360	SB360	SB360	SB380
9514	JMP	JMP	---	---

REGION	NAFTA	ROW
1506	---	Main Switch
9507	JMP	---
9508	JMP	---

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140604

Mono Carrier: Deflection

A2 LINE + FRAME DEFLECTION

From LOT 5450 (For A80ERF042X14 Tube Only)

BEAM CURRENT MEASUREMENT

HORIZONTAL DEFLECTION COIL OR To 1404 of G

FRAME DEFLECTION

EW DRIVE

VERTICAL DEFLECTION COIL

F401	130V / div DC
F402	32V8 / div DC
F452	-13V4 / div DC
F453	190V8 / div DC

F412: 2V / div DC, 20µs / div
F414: 200V / div DC, 20µs / div
F418: 5V / div DC, 20µs / div
F455: 5V / div DC, 20µs / div
F458: 20 V / div DC, 5ms / div
F459: 1V / div DC, 5ms / div
F460: 500mV / div DC, 5ms / div
F461: 500mV / div DC, 5ms / div

I416: 20V / div DC, 20µs / div
I417: 500mV / div DC, 20µs / div
I423: 10V / div DC, 20µs / div
I433: 10V / div DC, 20µs / div
I462: 10V / div DC, 5ms / div
I468: 5V / div DC, 5ms / div

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1401 B2 5451 D10
1402 A3 6401 A4
1404 B5 6403 C1
1451 F9 6404 D4
1452 D8 6406 C5
1453 G2 6407 E2
1454 C8 6408 E3
1470 B8 6410 D5
2401 B3 6411 D4
2402 C4 6412 D4
2403 C4 6441 C3
2404 A4 6442 C3
2405 B4 6443 C2
2406 A5 6450 B9
2408 D2 6451 B8
2409 C2 6452 C8
2410 D2 6453 C8
2411 D4 6454 D9
2412 D4 6455 D9
2413 D4 6456 D7
2414 D1 6457 E7
2415 C5 6458 E8
2416 D5 6459 D8
2417 C5 6480 B9
2418 C6 6481 C8
2419 D5 6482 A10
2420 D1 6483 C9
2425 G4 6484 C10
2427 A5 6486 C1
2428 G4 6488 G5
2451 B8 6489 G5
2453 B8 6491 D5
2454 C9 7401 A3
2455 C9 7402 B3
2456 D9 7403 B4
2457 C8 7404 D2
2458 C9 7405 C4
2459 D7 7406 F3
2460 D8 7408 C2
2461 E6 7410 G2
2462 E7 7411 F3
2463 E8 7451 E9
2464 F8 7452 F8
2465 E9 7453 F8
2467 F9 7454 E8
2468 E8 7455 E6
2469 F8 7456 E7
2470 E9 7480 A7
2480 C9 7481 B9
2481 A8 7482 A9
2482 F3 7483 A8
2483 A9 7484 G3
2484 C9 9401 D5
2486 C3 9402 D6
2487 E4 9407 E6
2488 E3 9410 A5
2489 C3 9417 C6
2490 D9 9451 D10
2491 A9 F401 A1
2492 D5 F402 A1
3401 A2 F404 B2
3403 B2 F407 D3
3404 C5 F412 C1
3405 B2 F414 A5
3406 B3 F415 A5
3407 B3 F416 B6
3409 B4 F417 B6
3410 B4 F418 C4
3411 A4 F419 C4
3412 B5 F420 A5
3414 C1 F451 A9
3415 C2 F452 C10
3416 C4 F453 C10
3417 C5 F454 C8
3418 F2 F455 D9
3420 G2 F456 D10
3425 E4 F457 E8
3427 G5 F458 F9
3428 F5 F459 F9
3430 C4 F460 F6
3431 F4 F461 F6
3432 A5 F462 A9
3433 A6 F463 C9
3434 A6 F464 C6
3436 E4 F465 C6
3437 E9 F466 D9
3440 G3 I401 B2
3441 C2 I402 A3
3442 B8 I403 B3
3443 B8 I404 B3
3445 C1 I405 B3
3446 F3 I406 C3
3451 A6 I407 B4
3452 A7 I409 B4
3453 B7 I410 C5
3454 A8 I412 D5
3455 D7 I413 D2
3457 D8 I414 C3
3458 C8 I415 F3
3460 F6 I416 E3
3461 F7 I417 G2
3462 E7 I418 C3
3463 F7 I419 C1
3464 E8 I421 G4
3465 E7 I422 F5
3466 E9 I423 E4
3467 E9 I424 A8
3468 F9 I425 G2
3469 F7 I426 G5
3470 F8 I427 E2
3471 F9 I428 D5
3472 F9 I429 A9
3473 A8 I430 C5
3474 E10 I431 G3
3475 D10 I432 A5
3476 A9 I433 A4
3477 A8 I434 G2
3478 B9 I443 A7
3480 A7 I444 A7
3481 C9 I445 A8
3482 B9 I446 A9
3483 B10 I448 B7
3484 C8 I449 B9
3485 D8 I451 A7
3486 B9 I452 B8
3487 A8 I453 C8
3488 A7 I455 C7
3489 C1 I456 D9
3490 A8 I457 C7
3491 A8 I458 D7
3492 A9 I459 D7
3493 B8 I460 E7
3494 B9 I461 E8
3495 G2 I462 D9
3497 E3 I463 F7
3498 G2 I464 F8
3499 E1 I465 B7
4437 E9 I466 C8
4492 A9 I467 D8
5401 B6 I468 F7
5402 C3 I469 A8
5403 E4 I470 E7
5405 E4 I471 E8
5406 E5 I472 F9
5408 E6 I473 D5
5410 A5 I474 A5
5450 B6 I475 D7

Mono Carrier: Diversity Table for A2 (Deflection)

DIVERSITY TABLE FOR **A2** DEFLECTION

Region	NAFTA							LATAM						AP					CHINA				INDIA		
Tube	LPD	LPD	LPD	LPD	LPD	LPD	SMGK	25 RF	LPD	LPD	LPD	LPD	SMGK	CPT	LPD	LPD	LPD	LPD	LPD	LPD	LPD	LPD	CPD	LPD	SMGK
Size	27 V	28 WR	29 RF	32 V	32 V RF	32 WR	25 RF		27V	28WS	28WR	32WR	29RF	21RF	25RF	29RF	32WR	34RF	25RF	21RF	29RF	34RF	21RF	29RF	29FSQ
2411	470pF	1.2nF	1.5nF	2.2nF	680pF	330pF	1.2nF	680nF	470pF	1.2nF	1.2nF	330pF	1.5nF	220pF	680nF	1.2nF	330pF	1nF	680nF	220pF	1.2nF	1nF	220pF	1.2nF	680pF
2412	12nF	13nF	15nF	15nF	12nF	13nF	15nF	15nF	12nF	15nF	13nF	13nF	15nF	8n2	15nF	15nF	13nF	12nF	15nF	8n2	15nF	12nF	8n2	15nF	13nF
2413	120nF	15nF	39nF	33nF	33nF	18nF	33nF	33nF	120nF	18nF	15nF	18nF	39nF	68nF	33nF	33nF	18nF	33nF	33nF	68nF	33nF	33nF	68nF	33nF	39nF
2416	-	3n3	-	-	4n7	-	-	-	-	2n2	3n3	-	-	-	-	3n3	-	-	-	-	3n3	-	-	3n3	-
2418	390nF	-	330nF	470nF	270nF	-	390nF	360nF	390nF	-	-	-	330nF	220nF	360nF	330nF	-	300nF	360nF	270nF	330nF	300nF	220nF	330nF	390nF
2419	-	390nF	2u2	2u2	2u2	430nF	2u2	2u2	-	470nF	390nF	430nF	2u2	-	2u2	2u2	430nF	2u2	2u2	-	2u2	2u2	-	2u2	2u2
2425	-	33nF	33nF	33nF	10nF	33nF	33nF	33nF	-	33nF	33nF	33nF	33nF	-	33nF	33nF	33nF	10nF	33nF	-	33nF	10nF	-	33nF	33nF
2451	150nF	150nF	180nF	180nF	150nF	180nF	100nF	100nF	150nF	120nF	150nF	180nF	100nF	120nF	120nF	220nF	180nF	270nF	120nF	220nF	220nF	270nF	120nF	220nF	220nF
2457	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7
2487	-	1n5	1n5	1n5	2n2	1n5	1n5	1n5	4u7	1n5	1n5	1n5	3n3	1nF	1n5	1nF	1n5	3n3	1n5	1nF	1nF	3n3	1nF	1nF	1nF
2490	47n	-	-	-	-	-	47n	-	47n	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3224	680K 5%	680K 5%	680K 5%	680K 5%	560K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	560K 5%	680K 5%	680K 5%	1M 5%	680K 5%	680K 5%	680K 5%	1M 5%	680K 5%	1M 5%	1M 5%	1M 5%	1M 5%	680K 5%	1M 5%
3295	8K2 5%	10K 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	10K 5%	8K2 5%	8K2 5%	2K7 5%	8K2 5%	10K 5%	8K2 5%	7K5 1%	8K2 5%	8K2 5%	10K 5%	7K5 1%	2K7 5%	10K 5%	8K2 5%
3414	1R 1W 5%	2R2 1W 5%	1R 1W 5%	0R33 1W 5%	1R 1W 5%	6R8 1W 5%	3R3 1W 5%	1R 1W 5%	1R 1W 5%	4R7 1W 5%	2R2 1W 5%	6R8 1W 5%	0R33 1W 5%	10R 1W 5%	1R 1W 5%	1R 1W 5%	6R8 1W 5%	6R8 1W 5%	1R 1W 5%	4R7 1W 5%	1R 1W 5%	6R8 1W 5%	10R 1W 5%	1R 1W 5%	4R7 1W 5%
3431	82K 1%	82K 1%	82K 1%	82K 1%	10K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	10K 1%	82K 1%	82K 1%	82K 1%	10K 1%	82K 1%	82K 1%	82K 1%
3451	68K 1%	82K 1%	68K 1%	75K 1%	68K 1%	82K 1%	68K 1%	68K 1%	68K 1%	120K 1%	82K 1%	82K 1%	68K 1%	82K 1%	68K 1%	68K 1%	82K 1%	68K 1%	68K 1%	68K 1%	68K 1%	68K 1%	82K 1%	68K 1%	56K 1%
3452	18K 5%	15K 5%	15K 5%	15K 5%	6K8 5%	6K8 5%	18K 5%	18K 5%	18K 5%	27K 5%	15K 5%	6K8 5%	15K 5%	18K 5%	18K 5%	18K 5%	6K8 5%	18K 5%	18K 5%	18K 5%	15K 5%	18K 5%	18K 5%	15K 5%	18K 5%
3453	33K 5%	22K 5%	33K 5%	22K 5%	33K 5%	22K 5%	33K 5%	33K 5%	33K 5%	33K 5%	22K 5%	22K 5%	33K 5%	33K 5%	33K 5%	33K 5%	22K 5%	33K 5%	33K 5%	33K 5%	33K 5%	33K 5%	33K 5%	33K 5%	33K 5%
3467	120R 5%	120R 5%	120R 5%	220R 5%	150R 5%	220R 5%	120R 5%	120R 5%	120R 5%	220R 5%	120R 5%	220R 5%	120R 5%	220R 5%	120R 5%	120R 5%	220R 5%	150R 5%	120R 5%	220R 5%	120R 5%	150R 5%	220R 5%	120R 5%	220R 5%
3468	220R 5%	150R 5%	150R 5%	150R 5%	150R 5%	220R 5%	150R 5%	150R 5%	220R 5%	220R 5%	150R 5%	220R 5%	150R 5%	220R 5%	150R 5%	150R 5%	220R 5%	150R 5%	150R 5%	220R 5%	150R 5%	150R 5%	220R 5%	150R 5%	220R 5%
3471	-	2R7 1%	2R4 1%	2R4 1%	2R2 1%	1R8 1%	2R2 1%	2R4 1%	-	2R2 1%	2R7 1%	1R8 1%	1R8 1%	2R2 1%	2R4 1%	2R4 1%	1R8 1%	2R2 1%	2R4 1%	3R9 1%	2R4 1%	2R2 1%	2R2 1%	2R4 1%	2R2 1%
3472	3R3 1%	2R4 1%	2R4 1%	2R7 1%	2R2 1%	3R3 1%	2R 1%	2R4 1%	3R3 1%	3R3 1%	2R4 1%	3R3 1%	2R2 1%	3R9 1%	2R4 1%	2R4 1%	3R3 1%	2R2 1%	2R4 1%	4R7 1%	2R4 1%	2R2 1%	3R9 1%	2R4 1%	2R2 1%
3473	390K 5%	680K 5%	820K 5%	820K 5%	820K 5%	820K 5%	680K 5%	820K 5%	390K 5%	1M 5%	680K 5%	820K 5%	1M 5%	390K 5%	820K 5%	680K 5%	820K 5%	430K 5%	820K 5%	680K 5%	680K 5%	430K 5%	390K 5%	680K 5%	680K 5%
3474	15K 5%	12K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	12K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%
3481	5R6 5%	5R6 5%	10R 5%	2R7 5%	5R6 5%	4R7 5%	-	-	5R6 5%	-	5R6 5%	4R7 5%		-	-	-	4R7 5%	-			-	-		-	-
3482	22K 1%	22K 1%	2K4 1%	22K 1%	22K 1%	22K 1%	-	-	22K 1%	-	22K 1%	22K 1%		-	-	-	22K 1%	-			-	-		-	-
3483	56K 1%	56K 1%	5K6 1%	56K 1%	56K 1%	56K 1%	-	-	56K 1%	-	56K 1%	56K 1%	-	-	-	-	56K 1%	-	-	-	-	-	-	-	-
3491	100K 5%	100K 5%	100K 5%	82K 5%	68K 5%	82K 5%	100K 5%	100K 5%	100K 5%	82K 5%	100K 5%	82K 5%	82K 5%	82K 5%	100K 5%	82K 5%	82K 5%	82K 5%	100K 5%	56K 5%	82K 5%	82K 5%	82K 5%	82K 5%	56K 5%
3494	180K 5%	-	100K 5%	150K 5%	680K 5%	680K 5%	-	-	180K 5%	-	-	680K 5%	-	-	-	-	680K 1%	-	-	-	-	-	-	-	-
3499	680K 5%	680K 5%	680K 5%	330K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	56K 5%	42uH	56K 5%	56K 5%	56K 5%
5401	50uH	42uH	33uH	33uH	25uH	42uH	33uH	37uH	50uH	16uH	42uH	42uH	25uH	82uH	37uH	33uH	42uH	42uH	-	82uH	33uH	42uH	82uH	33uH	33uH
5408	-	SC2132 9-00B	CU15	CU15	SC2132 9-00B	SC2132 9-00B	CU15	CU15	SC2132 9-00B	SC2132 9-00B	SC2132 9-00B	SC2132 9-00B	CU15	-	CU15	CU15	SC2132 9-00B	CU15	CU15	-	CU15	CU15	-	CU15	CU15
5450	JF0501-21835B	JF0501-85021B	JF0501-21836B	JF0501-21140B	JF0101-85020B	JF0101-85021B	JF0501-21835B	JF0501-2153B	JF0501-21835B	JF0501-21133B	JF0501-85021B	JF0101-85021B	JF0501-2136B	JF0501-2135B	JF0501-2135B	JF0501-2136B	JF0101-85021B	JF0501-2601B	JF0501-2135B	JF0501-2135B	JF0501-2136B	JF0501-2601B	JF0501-2135B	JF0501-2136B	JF0501-2133B
5451	27uH 10%	JMP	33uH 10%	27uH 10%	JMP	JMP	33uH 10%	27uH 10%	27uH 10%	39uH 10%	JMP	JMP	27uH 10%	68uH 5%	27uH 10%	27uH 10%	0.58mm COL	22uH	27uH 10%	68uH 5%	27uH 10%	22uH	68uH 5%	27uH 10%	22uH 10%
6404	DVM1500M	-	DVM1500M	DVM1500M	DVM1500M	-	DVM1500M	DVM1500M	DVM1500M	-	-	-	DMV1500M	DVM1500M	DVM1500M	DVM1500M	-	DVM1500M	DVM1500M	-	DVM1500M	DVM1500M	DVM1500M	DVM1500M	DVM1500M
6411	-	BY229X-800	-	-	-	BY229X-800	-	-	-	BY229X-80	BY229X-80	BY229X-800	-	-	-	-	BY229X-800	-	-	-	-	-	-	-	-
6412	-	BY359X-1500	-	-	-	BY359X-1500	-	-	-	BY359X-1500	BY359X-1500	BY359X-1500	-	-	-	-	BY359X-1500	-	-	-	-	-	-	-	-
7405	BU4508DX	BU2725DX	BU4508DX	BU2725DX	BU4508DX	BU2725DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU2725DX	BU2725DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU2725DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX	BU4508DX
9407	-	-	JMP	JMP	JMP	-	JMP	JMP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9417	-	JMP	-	-	-	JMP	-	-	-	JMP	JMP	JMP	-	-	-	-	JMP	-	-	-	-	-	-	-	-

Region	EUROPE							
Tube	LPD	LPD	LPD	LPD	LPD	LPD	LPD	LPD
Size	21RF	24 WR	25 I	28 I	29 RF	28 WR	28 WS	32 WR
2411	470pF	1n2	470pF	470pF	1nF	680pF	680pF	680pF
2412	8n2	13nF	9n1	9n1	13nF	11nF	11nF	11nF
2413	33nF	15nF	18nF	18nF	33nF	15nF	15nF	15nF
2416	-	2n2	-	-	-	4n7	2n2	4n7
2418	470nF	-	390nF	390nF	360nF	-	-	-
2419	2u2	470nF	470nF	470nF	2u2	430nF	470nF	430nF
2425	33nF	33nF	33nF	33nF	33nF	33nF	33nF	33nF
2451	220nF	220nF	220nF	220nF	220nF	220nF	220nF	220nF
2457	4u7	4u7	4u7	4u7	4u7	4u7	4u7	4u7
2487	1nF	1nF	1nF	1nF	1nF	1nF	1nF	1nF
2490	47n	-	-	-	-	-	-	-
3224	1M 5%	1M 5%	1M 5%	1M 5%	1M 5%	1M 5%	1M 5%	1M 5%
3295	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%	8K2 5%
3414	4R7 1W	4R7 1W	10R 1W 5%	10R 1W 5%	2R2 1W	3R3 1W	4R7 1W	3R3 1W
3431	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	82K 1%	68K 1%
3451	68K 1%	56K 1%	120K 5%	120K 5%	68K 1%	68K 1%	68K 1%	18K 5%
3452	18K 5%	18K 5%	18K 5%	18K 5%	18K 5%	18K 5%	18K 5%	220R 5%
3453	22K 5%	22K 5%	33K 5%	33K 5%	33K 5%	22K 5%	22K 5%	220R 5%
3467	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	1R5 1%
3468	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	220R 5%	6R8 1%
3471	3R3 1%	3R3 5%	1R5 1%	1R5 1%	2R2 1%	1R5 1%	3R3 1%	470K 5%
3472	3R3 1%	3R3 1%	2R2 1%	2R2 1%	2R2 1%	6R8 1%	3R3 1%	15K 5%
3473	470K 5%	470K 5%	680K 5%	680K 5%	680K 5%	470K 5%	470K 5%	-
3474	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	15K 5%	-
3481	-	-	-	-	-	-	-	-
3482	-	-	-	-	-	-	-	56K 5%
3483	-	-	-	-	-	-	-	56K 5%
3491	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	-
3494	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	56K 5%	680K 5%
3499	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%	680K 5%
5401	82uH	37uH	50uH	50uH	25uH	50uH	25uH	25uH
5408	CU15	SC21329-00B	SC21329-00B	SC21329-00B	CU15	SC21329-00B	SC21329-00B	SC21329-00B
5450	1342.0033CY	1342.0048B	1342.0048B	1342.0048B	1362.0016AB	1362-0015AB	1342.0042CY	1362-0015AB
5451	22uH 10%	22uH 10%	27uH 10%	27uH 10%	39uH 10%	0.588 COL	22uH 10%	33uH 10%
6404	DVM1500M	-	-	-	DVM1500M	-	-	-
6411	-	BY229X-800	BY229X-800	BY229X-800	-	BY229X-800	BY229X-800	BY229X-800
6412	-	BY359X-1500	BY359X-1500	BY359X-1500	-	BY359X-1500	BY359X-1500	BY359X-1500
7405	BU4508DX	BU2725DX	BU2725DX	BU2725DX	BU4508DX	BU2725DX	BU4508DX	BU2725DX
9407	JMP	-	-	-	JMP	-	JMP	-
9417	-	JMP	-	-	-	JMP	JMP	JMP

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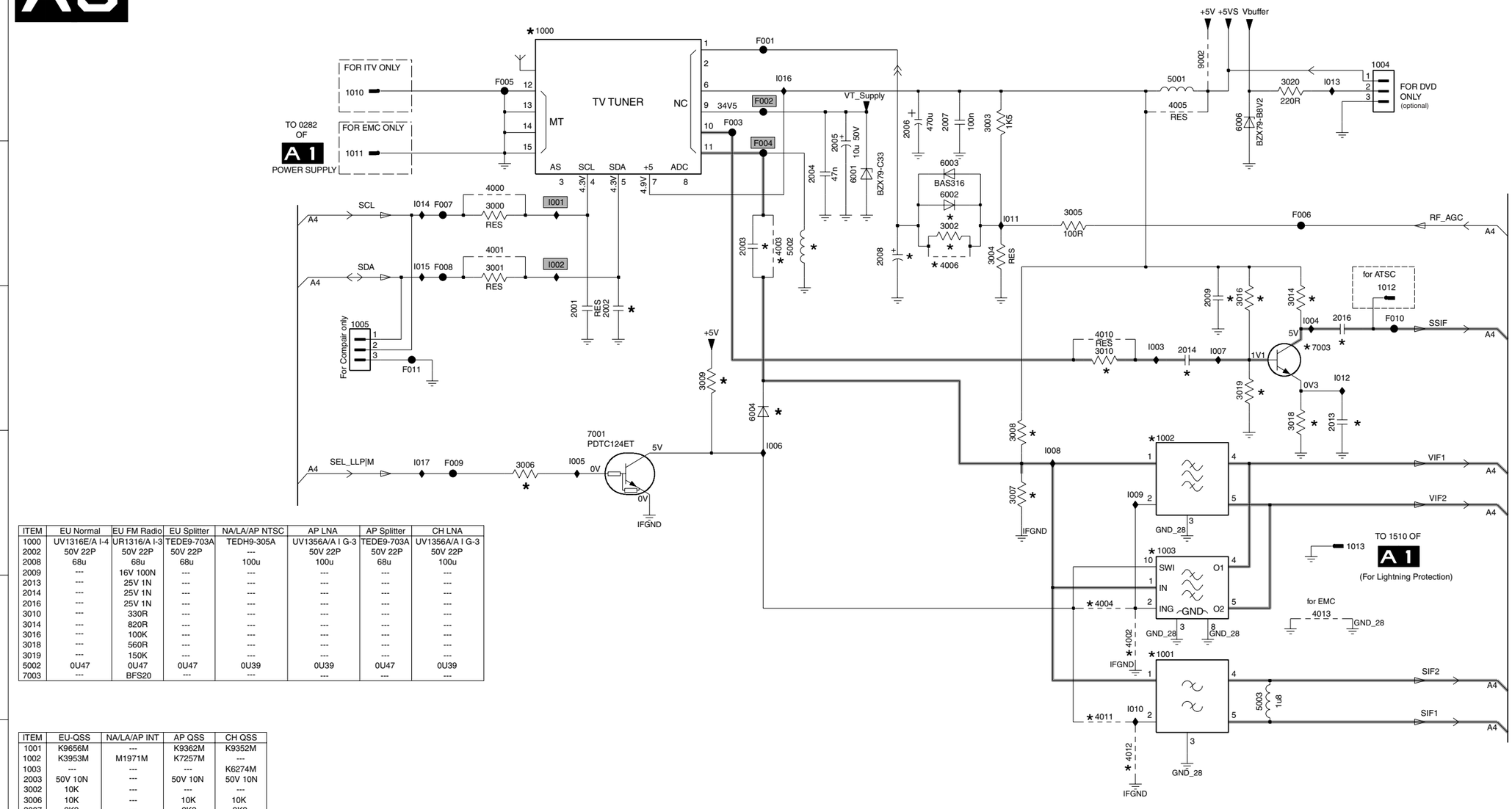
Mono Carrier: Tuner IF

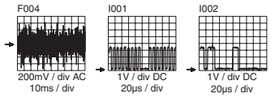
A3 TUNER IF



ITEM	EU Normal	EU FM Radio	EU Splitter	NA/LA/AP NTSC	AP LNA	AP Splitter	CH LNA
1000	UV1316E/A I-4	UR1316/A I-3	TEDE9-703A	TEDH9-305A	UV1356A/A I G-3	TEDE9-703A	UV1356A/A I G-3
2002	50V 22P	50V 22P	50V 22P	---	50V 22P	50V 22P	50V 22P
2008	68u	68u	68u	100u	100u	68u	100u
2009	---	16V 100N	---	---	---	---	---
2013	---	25V 1N	---	---	---	---	---
2014	---	25V 1N	---	---	---	---	---
2016	---	25V 1N	---	---	---	---	---
3010	---	330R	---	---	---	---	---
3014	---	820R	---	---	---	---	---
3016	---	100K	---	---	---	---	---
3018	---	560R	---	---	---	---	---
3019	---	150K	---	---	---	---	---
5002	0U47	0U47	0U47	0U39	0U39	0U47	0U39
7003	---	BFS20	---	---	---	---	---

ITEM	EU-QSS	NA/LA/AP INT	AP QSS	CH QSS
1001	K9656M	---	K9362M	K9352M
1002	K3953M	M1971M	K7257M	---
1003	---	---	---	K6274M
2003	50V 10N	---	50V 10N	50V 10N
3002	10K	---	---	---
3006	10K	---	10K	10K
3007	2K2	---	2K2	2K2
3008	6K8	---	6K8	6K8
3009	2K2	---	2K2	2K2
4002	JMP	JMP	---	JMP
4003	---	JMP	---	---
4004	---	---	JMP	---
4006	---	JMP	JMP	JMP
4011	JMP	---	---	---
4012	---	---	JMP	JMP
6002	BAS316	---	---	---
6004	1SS356	---	1SS356	1SS356
7001	PDTC124ET	---	PDTC124ET	PDTC124ET

F003 0V (N.A.)



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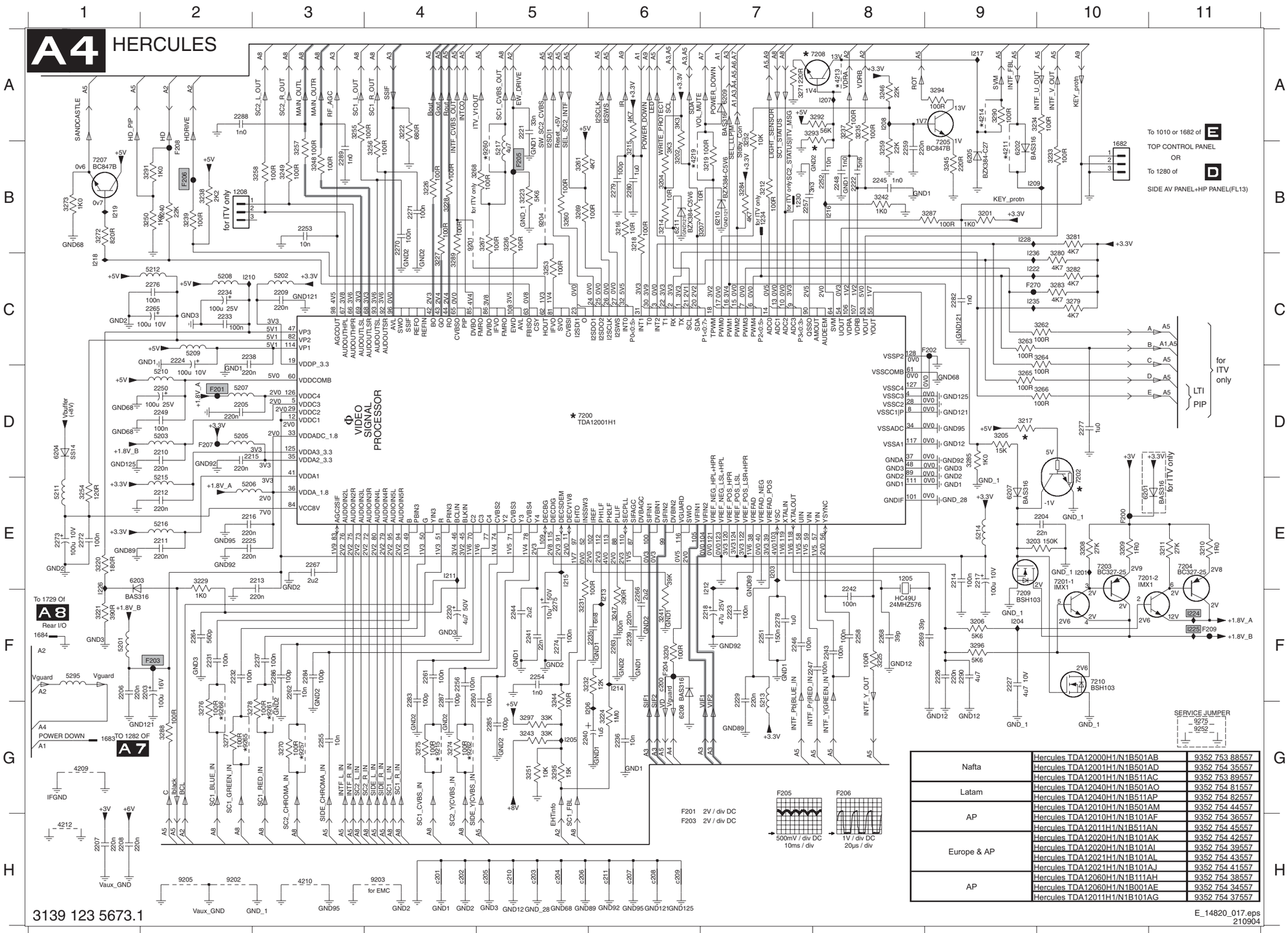
1000 A4
1001 E8
1002 D8
1003 D8
1004 A10
1005 C3
1010 A3
1011 B3
1012 C10
1013 D10
2001 C4
2002 C4
2003 B5
2004 B6
2005 B6
2006 A6
2007 A7
2008 B6
2009 C9
2013 C9
2014 C8
2016 C9
3000 B4
3001 B4
3002 B7
3003 A7
3004 B7
3005 B8
3006 D4
3007 D7
3008 D7
3009 C5
3010 C8
3014 C9
3016 C9
3018 C9
3019 C9
3020 A9
4000 B4
4001 B4
4002 E8
4003 B6
4004 E8
4005 A8
4006 B7
4010 C8
4011 E8
4012 F8
4013 E9
5001 A8
5002 B6
5003 E9
6001 B6
6002 B7
6003 B7
6004 C5
6006 A9
7001 D4
7003 C9
9002 A8
F001 A5
F002 A5
F003 A5
F004 B5
F005 A4
F006 B9
F007 B3
F008 B3
F009 D3
F010 C10
F011 C3
I001 B4
I002 B4
I003 C8
I004 C9
I005 D4
I006 D6
I007 C9
I008 D7
I009 D8
I010 E8
I011 B7
I012 C9
I013 A9
I014 B3
I015 B3
I016 A6
I017 D3

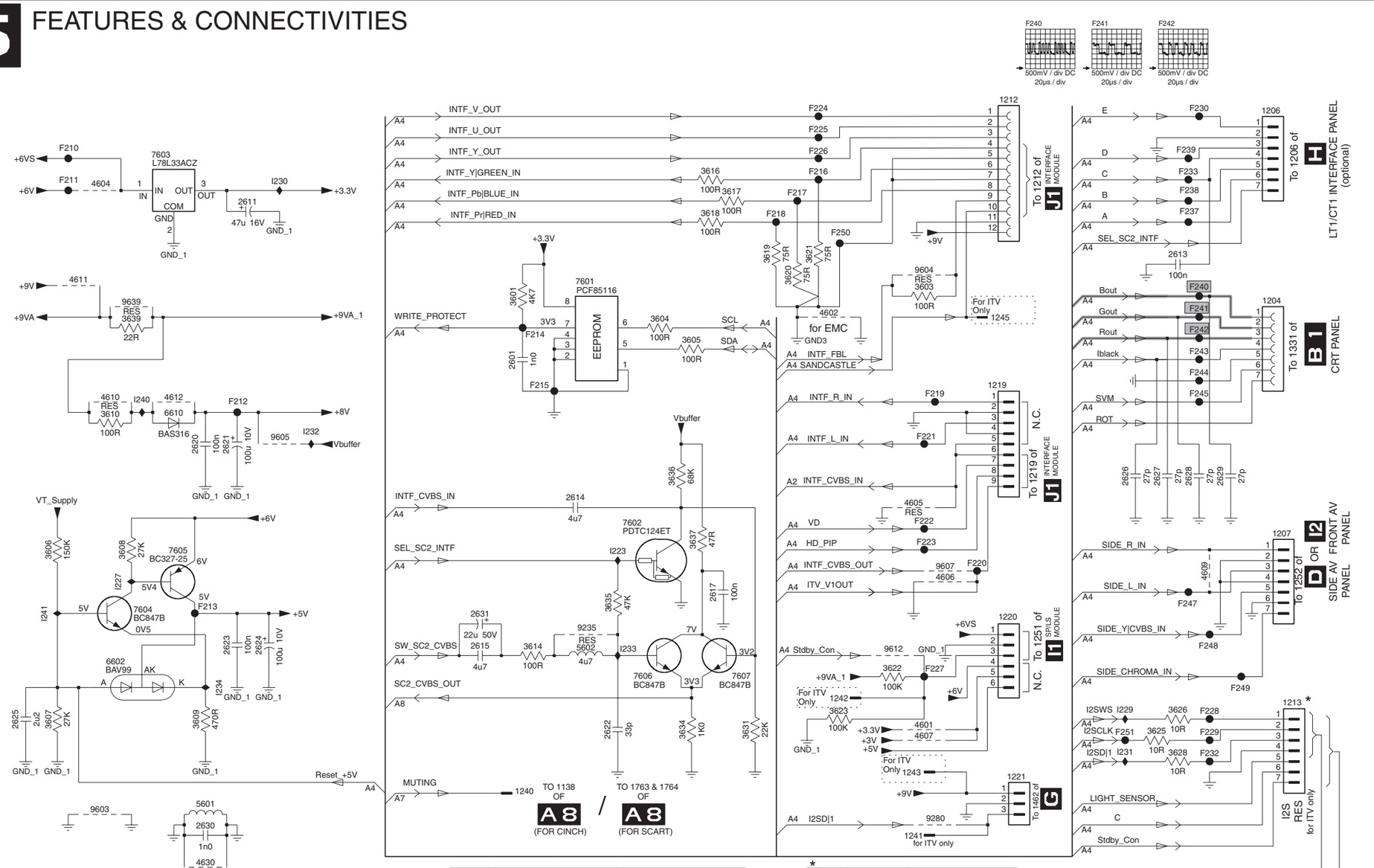
Mono Carrier: Hercules

A4 HERCULES


VIDEO SIGNAL PROCESSOR
TDA12001H1
SIDE AV PANEL+HP PANEL(FL13)
TOP CONTROL PANEL
SERVICE JUMPER
for ITV only
LTI PIP
KEY_protn
KEY_protn
SANDCASTLE
HD_PIP
HD
HDRIVE
SC2_L_OUT
SC2_R_OUT
MAIN_OUTL
MAIN_OUTR
RF_AGC
SC1_L_OUT
SC1_R_OUT
SSIF
SC1_CVBS_OUT
EW_DRIVE
INTF_CVBS_OUT
ITV_V1OUT
SC2_CVBS_IN
SC2_INTF
SEL_SC2_INTF
I2SCLK
I2SWS
IR
LED
POWER_DOWN
WRITE_PROTECT
SCL
SDA
VOL_MUTE
BAS316
SEL_CLIP_TOP
LIGHT_SENSOR
SC1_STATUS
ITV_MSG
SC2_STATUS
ROT
SVM
INTF_FBL
INTF_U_OUT
INTF_V_OUT
VDRA
VDRB
BC847B
BC847B
HC49U 24MHZ576
BSH103
BC327-25
BAS316
BZX384-C5V6
BZX384-C4V3
BZX384-C27
BZX384-C6V2
BAS316
BAS316
BAS316

Mono Carrier: Features & Connectivities

A5 FEATURES & CONNECTIVITIES



1206	DVD	iDTV	USB	PCMCIA
A	-	-	-	-
B	Power On	Power On	Power On	Power On
C	Bus Request	Bus Request	Bus Request	Bus Request
D	Rx	-	Rx	Rx
E	Tx	-	Tx	Tx

*

1213	MTV	ITV
1	I2SWS	ITV DATA OUT/SDA
2	I2SCLK	ITV DATAIN
3	I2SDI1	ITV CLOCK
4	GND	GND
5	Light sensor	ITV SCL
6	C	ITV POR 1
7	Stdby-con	Stdby-con

3139 123 5673.1

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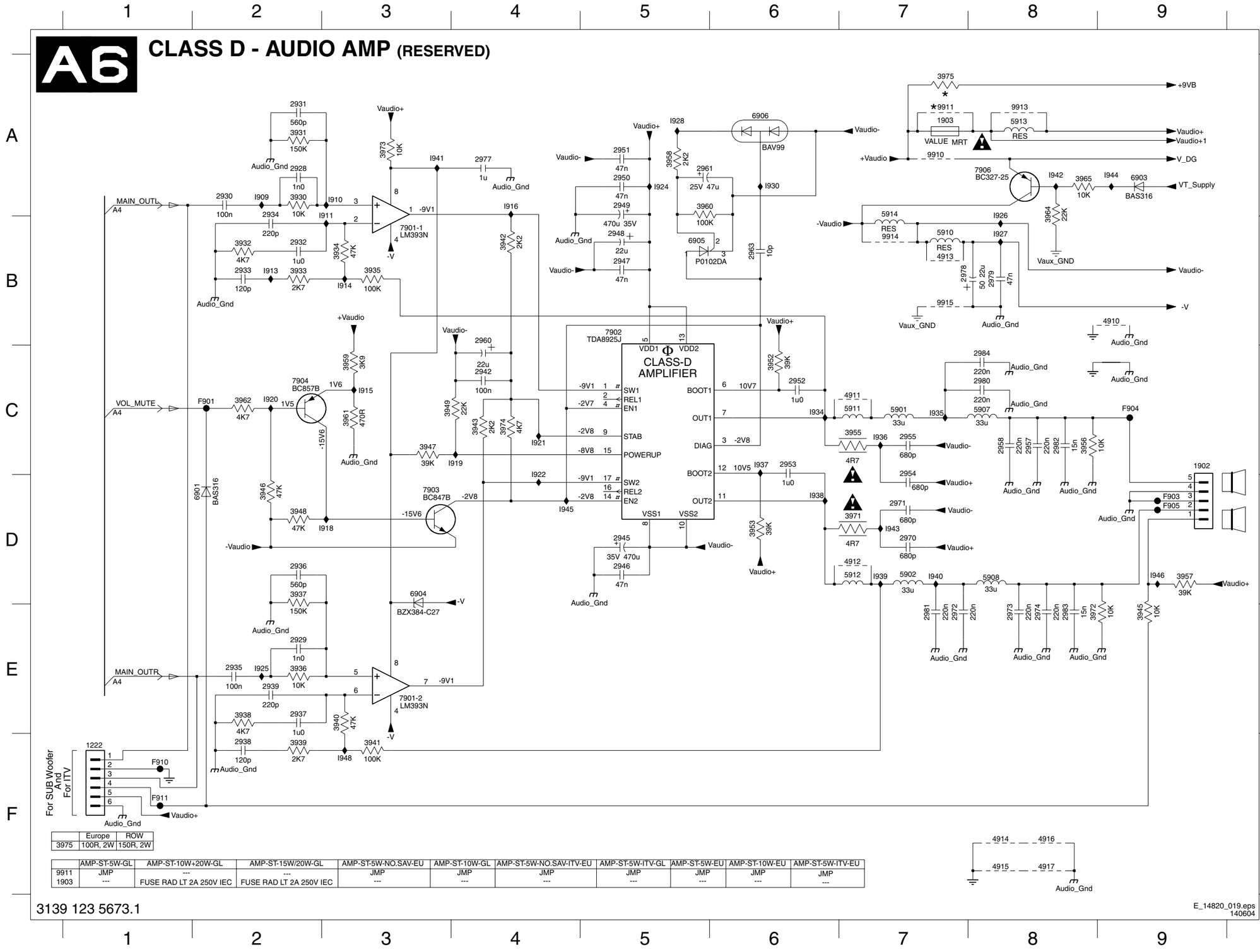
150904

1204 B9 9639 B2
1206 A9 F210 A1
1207 D9 F211 B1
1212 A7 F212 C2
1213 E9 F213 D2
1219 C8 F214 C4
1220 E8 F215 C4
1221 F8 F216 B6
1240 F4 F217 B6
1241 F7 F218 B6
1242 E6 F219 C7
1243 F7 F220 D7
1245 C7 F221 C7
2601 C4 F222 D7
2611 B2 F223 D7
2613 B9 F224 A6
2614 D5 F225 A6
2615 E4 F226 A6
2617 D6 F227 E7
2620 C2 F228 E9
2621 C2 F229 E9
2622 E5 F230 A9
2623 E2 F232 E9
2624 E2 F233 B9
2625 E1 F237 B9
2626 D8 F238 B9
2627 D9 F239 A9
2628 D9 F240 B9
2629 D9 F241 B9
2630 F2 F242 C9
2631 E4 F243 C9
3601 B4 F244 C9
3603 B7 F245 C9
3604 C5 F247 D9
3605 C5 F248 E9
3606 D1 F249 E9
3607 E1 F250 B7
3608 D2 F251 E8
3609 E2 I223 D5
3610 C1 I227 D1
3614 E4 I229 E8
3616 B6 I230 B3
3617 B6 I231 E8
3618 B6 I232 C3
3619 B6 I233 E5
3620 B6 I234 E2
3621 B6 I240 C2
3622 E7 I241 D1
3623 E7
3625 E9
3626 E9
3628 E9
3631 E6
3634 E5
3635 D5
3636 D5
3637 D5
3639 C2
4601 E7
4602 B6
4604 B1
4605 D7
4606 D7
4607 E7
4609 D9
4610 C1
4611 B1
4612 C2
4630 F2
5601 F2
5602 E5
6602 E1
6610 C2
7601 B5
7602 D5
7603 A2
7604 D2
7605 D2
7606 E5
7607 E6
9235 E5
9280 F7
9603 F1
9604 B7
9605 C3
9607 D7
9612 E7

Mono Carrier: Class D - Audio Amplifier

A6 CLASS D - AUDIO AMP (RESERVED)



	Europe	ROW
3975	100R, 2W	150R, 2W

	AMP-ST-5W-GL	AMP-ST-10W+20W-GL	AMP-ST-15W/20W-GL	AMP-ST-5W-NO.SAV-EU	AMP-ST-10W-GL	AMP-ST-5W-NO.SAV-ITV-EU	AMP-ST-5W-ITV-GL	AMP-ST-5W-EU	AMP-ST-10W-EU	AMP-ST-5W-ITV-EU
9911	JMP	---	---	JMP	JMP	JMP	JMP	JMP	JMP	JMP
1903	---	FUSE RAD LT 2A 250V IEC	FUSE RAD LT 2A 250V IEC	---	---	---	---	---	---	---

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1222 F1
1902 C9
1903 A7
2928 A2
2929 E2
2930 A2
2931 A2
2932 B2
2933 B2
2934 B2
2935 E2
2936 D2
2937 E2
2938 F2
2939 E2
2942 C4
2945 D5
2946 D5
2947 B5
2948 B5
2949 A5
2950 A5
2951 A5
2952 C6
2953 C6
2954 D7
2955 C7
2957 C8
2958 C8
2960 B4
2961 A5
2963 B6
2970 D7
2971 D7
2972 E7
2973 E8
2974 E8
2977 A4
2978 B7
2979 B8
2980 C8
2981 E7
2982 C8
2983 E8
2984 C8
3930 A2
3931 A2
3932 B2
3933 B2
3934 B3
3935 B3
3936 E2
3937 D2
3938 E2
3939 F2
3940 E3
3941 F3
3942 B4
3943 C4
3945 E9
3946 D2
3947 C3
3948 D2
3949 C3
3952 C6
3953 D6
3955 C7
3956 C8
3957 D9
3958 A5
3959 C3
3960 A5
3961 C3
3962 C2
3964 A8
3965 A8
3971 D7
3972 E8
3973 A3
3974 C4
3975 A7
4910 B9
4911 C7
4912 D7
4913 B7
4914 F8
4915 F8
4916 F8
4917 F8
5901 C7
5902 D7
5907 C8
5908 D8
5910 B7
5911 C7
5912 D7
5913 A8
5914 B7
6901 D2
6903 A9
6904 D3
6905 B5
6906 A6
7901-1 B3
7901-2 E3
7902 B5
7903 D3
7904 C2
7906 A8
9910 A7
9911 A7
9913 A8
9914 B7
9915 B7
F901 C2
F903 D9
F904 C9
F905 D9
F910 F1
F911 F1
I909 A2
I910 A3
I911 A3
I913 B2
I914 B3
I915 C3
I916 A4
I918 D3
I919 C4
I920 C2
I921 C4
I922 C4
I924 A5
I925 E2
I926 A8
I927 B8
I928 A5
I930 A6
I934 C6
I935 C7
I936 C7
I937 C6
I938 D6
I939 D7
I940 D7
I941 A3
I942 A8
I943 D7
I944 A9
I945 D4
I946 D9
I948 F3

Mono Carrier: Audio Amplifier

A7 AUDIO_AMPLIFIER

MAIN_OUTL
A4
F950
2985 RES
3985 1K0
I953
3988 4K7
2989 220n
2990 1n0
I951
MAIN_OUTR
A4
F951
2991 RES
3991 1K0
I954
3992 4K7
2992 220n
2993 1n0
I952
7990 TDA2616Q +16V
Vaudio+1
2987 100n
2986 100n
AmpOutL
2994 22n
I956
3989 10R
2996 47n
Audio_Gnd
AmpOutR
2995 22n
I957
3993 10R
2997 47n
Audio_Gnd
F952
F955
F953
1280 1281
TO 1246
I1
SP/LS MODULE
BATH ROOM SPEAKER CONNECTION
8 OHM 15W
8 OHM 15W
OR
TO 1254
D
SIDE I/O PANEL
+16V
-16V
7991 BC847B
16V
I955
3995 47K
2916 4u7
2988 100n
-Vaudio
Vaudio+1
3994 68K
7992 BC847B
VOL_MUTE
A4
I958
0V7
3996 68K
3997 820K
7993 BC847B
TO 1683 OF A4
1282
POWER DOWN
6990 BAS316
I959
2911 4u7
2912 4u7
2913 4u7
2914 4u7
2915 4u7
3999 120K
Stdby_Con
A4
3998 10K
7994 BC847B
MUTING
A5
I951 50mV / div AC 2ms / div
I952 50mV / div AC 2ms / div
F952 500mV / div AC 2ms / div
F955 500mV / div AC 2ms / div

1280 B9
1281 B9
1282 D3
2911 D3
2912 D3
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2914 D4
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2985 B4
2986 A7
2987 A7
2988 C7
2989 B5
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2991 B4
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3996 D5
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3998 E3
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7990 B6
7991 C6
7992 C5
7993 D5
7994 E3
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I956 B8
I957 C8
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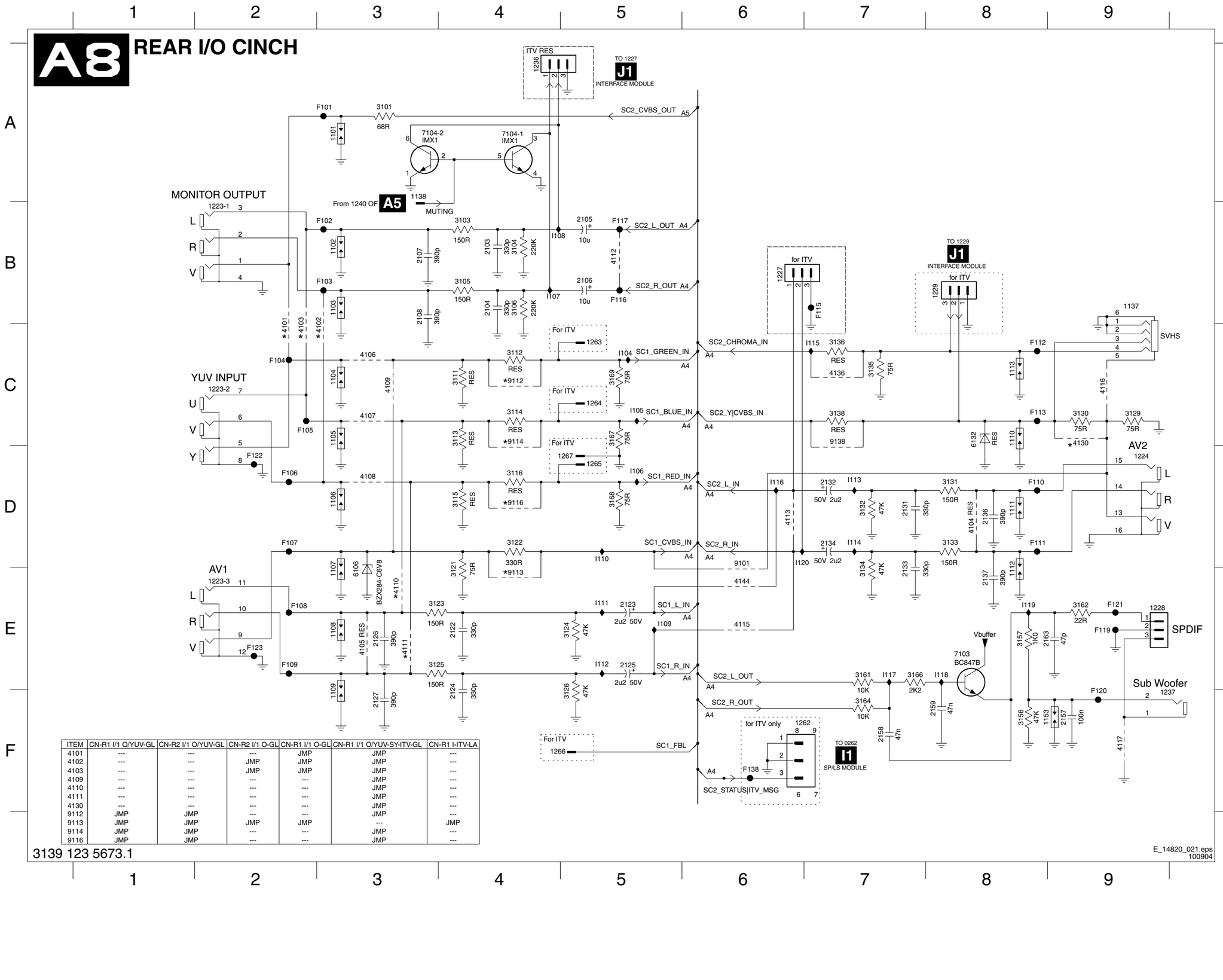
E_14820_020.eps
100904

Mono Carrier: Rear I/O Cinch

A8 REAR I/O CINCH



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4101	---	---	---	JMP	JMP	---
4102	---	---	JMP	JMP	JMP	---
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9113	JMP	JMP	JMP	JMP	---	JMP
9114	JMP	JMP	---	---	JMP	---
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1111 D8
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1153 F9
1223-1 B2
1223-2 C2
1223-3 E2
1227 B6
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1229 B8
1236 A4
1237 F9
1262 F6
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1266 F5
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2163 E9
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3103 B4
3104 B4
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3106 B4
3111 C4
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9112 C4
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9116 D4
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F109 E2
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F112 C8
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F115 B7
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F122 E2
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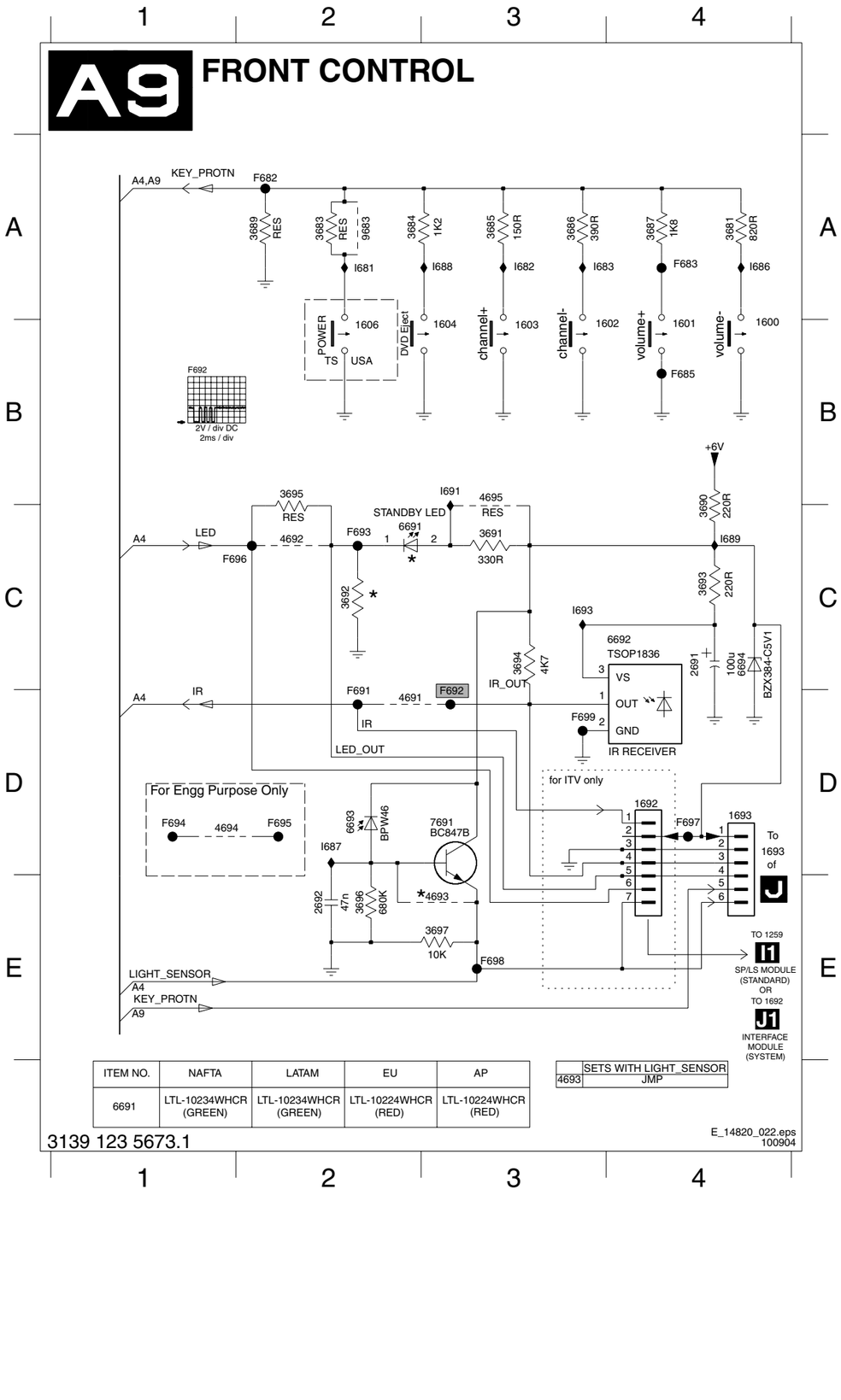
Mono Carrier: Front Control



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6691	LTL-10234WHCR (GREEN)	LTL-10234WHCR (GREEN)	LTL-10224WHCR (RED)	LTL-10224WHCR (RED)

	SETS WITH LIGHT_SENSOR
4693	JMP

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1602 A4
1603 B3
1604 B3
1606 B2
1692 D4
1693 D4
2691 C4
2692 E2
3681 A4
3683 A2
3684 A2
3685 A3
3686 A3
3687 A4
3689 A2
3690 C4
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3692 C2
3693 C4
3694 C3
3695 B2
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3697 E3
4691 D2
4692 C2
4693 E3
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6693 D2
6694 C4
7691 D3
9683 A2
F682 A2
F683 A4
F685 B4
F691 D2
F692 D3
F693 C2
F694 D1
F695 D2
F696 C1
F697 D4
F698 E3
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I683 A3
I686 A4
I687 D2
I688 A3
I689 C4
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I693 C3

Personal Notes:

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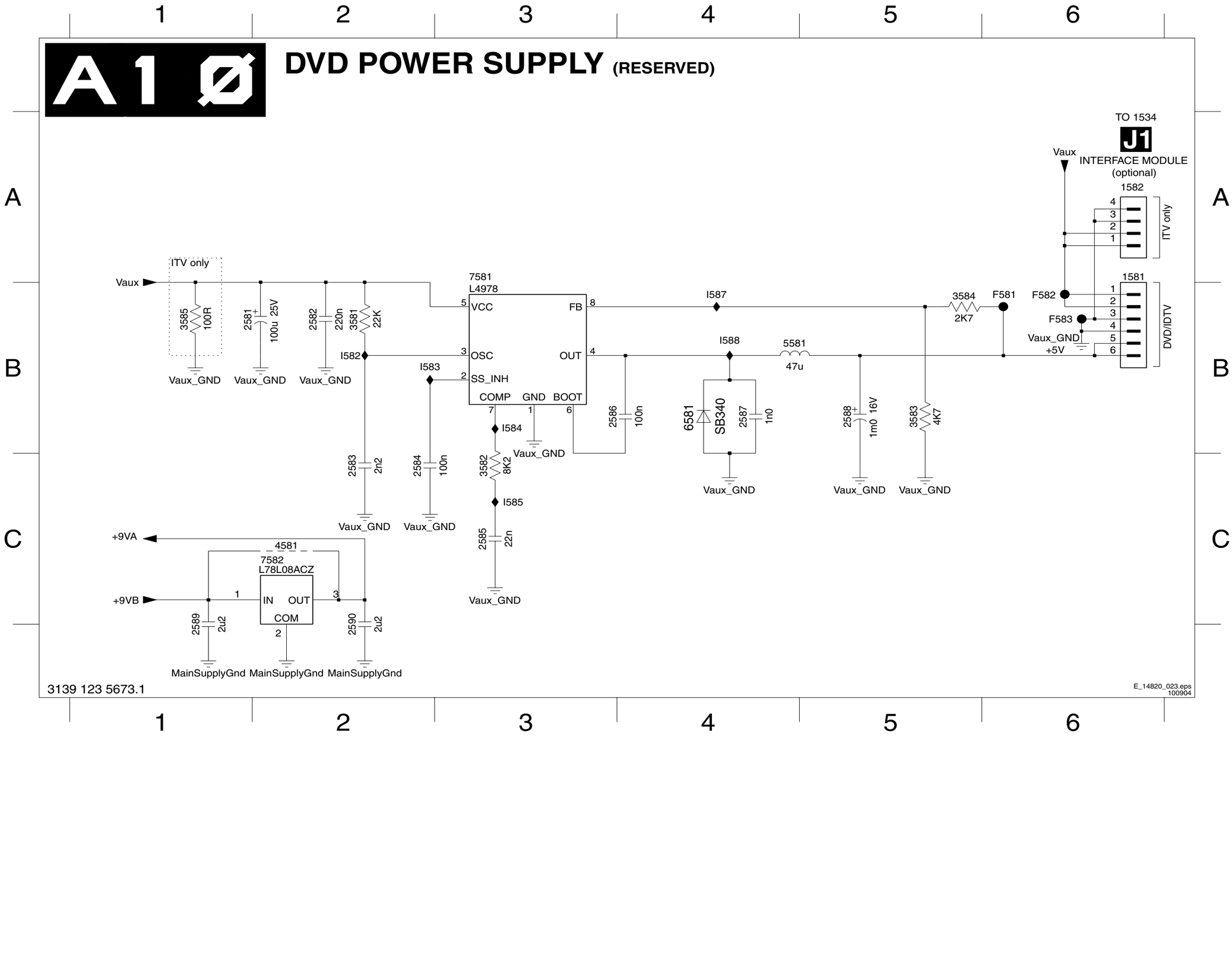
131004

Mono Carrier: DVD Power Supply

A10 DVD POWER SUPPLY (RESERVED)



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7582 C2
F581 B6
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F583 B6
I582 B2
I583 B2
I584 B3
I585 C3
I587 B4
I588 B4

Layout Mono Carrier: (Top Side)

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2540 C3 2541 C3 2542 B4 2543 B3 2546 B3 2552 C5 2561 C4 2562 B4 2563 C4 2565 C4 2570 B4 2581 C4 2588 C4 2621 E5 2624 E5 2691 B1 2945 D2 2948 D2 2949 D2 2961 D1 2978 C3 3020 E7 3101 D8 3103 D8 3105 D8 3112 D8 3114 D8 3116 D8 3122 D8 3123 D8 3125 D8 3131 C8 3133 D8 3138 D8 3157 E8 3167 D7 3199 D5 3201 D5 3215 D5 3224 E5 3230 D4 3231 D6 3234 C6 3238 D5 3239 C7 3241 E5 3246 D5 3249 D7 3252 D5 3258 D7 3260 D5 3270 D7 3274 D7 3275 E7 3276 C7 3277 C7 3278 D7 3291 D7 3401 C6 3403 A7 3406 A7 3407 A7 3410 A8 3411 A6 3414 C6 3415 B6 3417 A6 3418 C5 3425 C5 3430 B6 3431 C6 3432 B7 3433 B6 3434 B6 3440 C5 3441 B6 3442 A7 3443 A7 3454 A8 3455 B8 3457 B8 3458 B7 3460 B7 3461 C7 3466 C7 3467 C7 3468 C7 3470 C8 3471 C7 3472 C7 3482 B8 3483 B8 3484 B8 3485 B8 3497 C5 3500 B1 3501 B1 3502 A1 3503 B1 3504 B2 3505 A2 3506 B1 3508 A3 3509 B2 3510 B2 3511 B5 3513 A5 3514 A5 3515 A5 3516 A4 3519 B4 3520 A4 3523 B2 3529 B3 3531 B4 3532 B3 3534 B4 3542 B3 3560 C4 3563 C4 3571 B5 3574 B5 3575 B5 3584 C4 3585 D4 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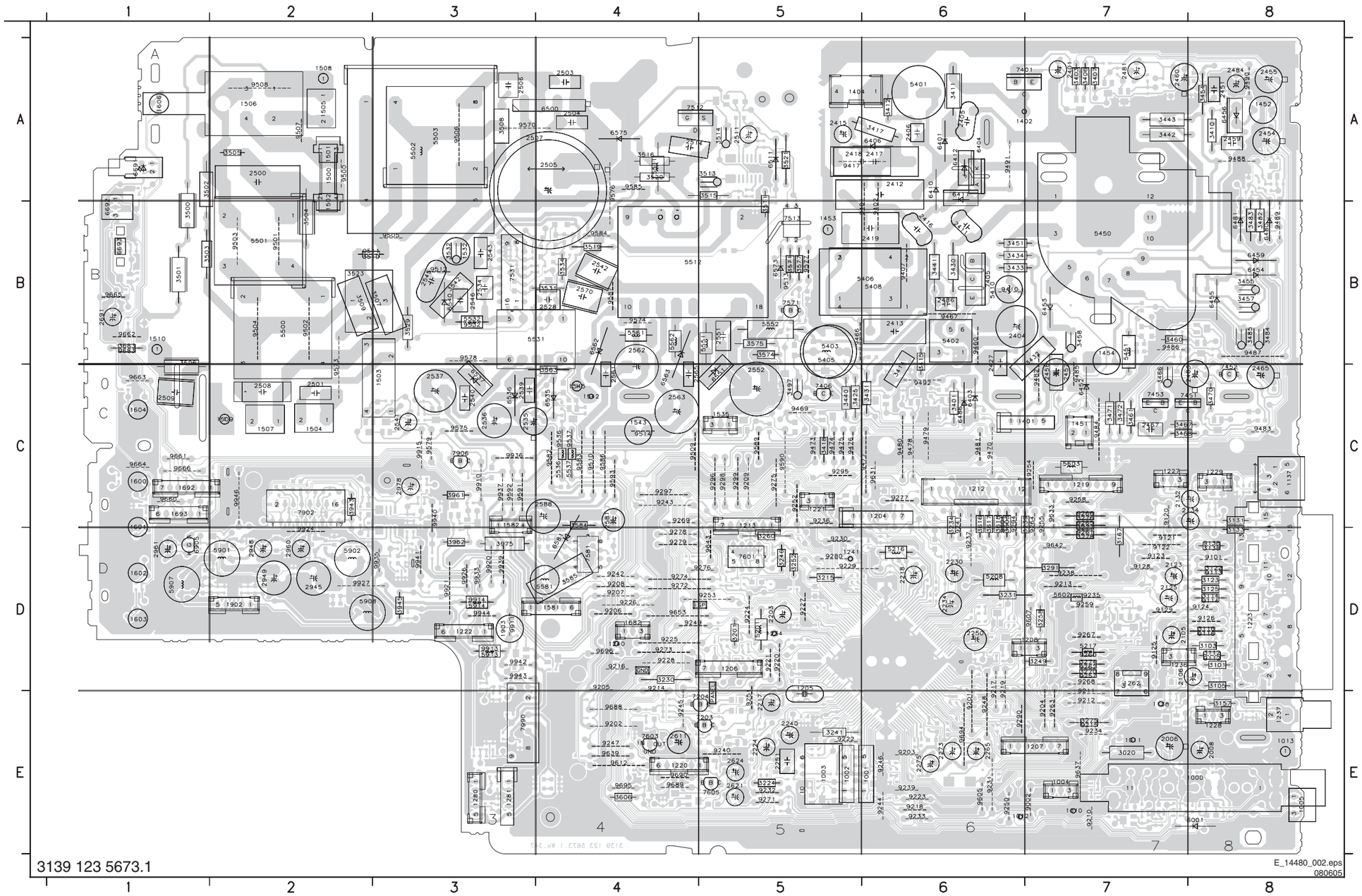

Layout Mono Carrier (Overview Bottom Side)

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2003 A7 2136 C8 2215 B6 2241 A5 2260 A6 2280 B5 2428 D7 2512 E5 2553 D4 2620 A5 2935 B3 2970 B2 2990 A3 3009 A5 3134 C8 3209 A4 3229 B6 3254 A6 3279 B5 3405 E7 3475 C7 3499 C6 3958 B1 4631 B4 6534 D4
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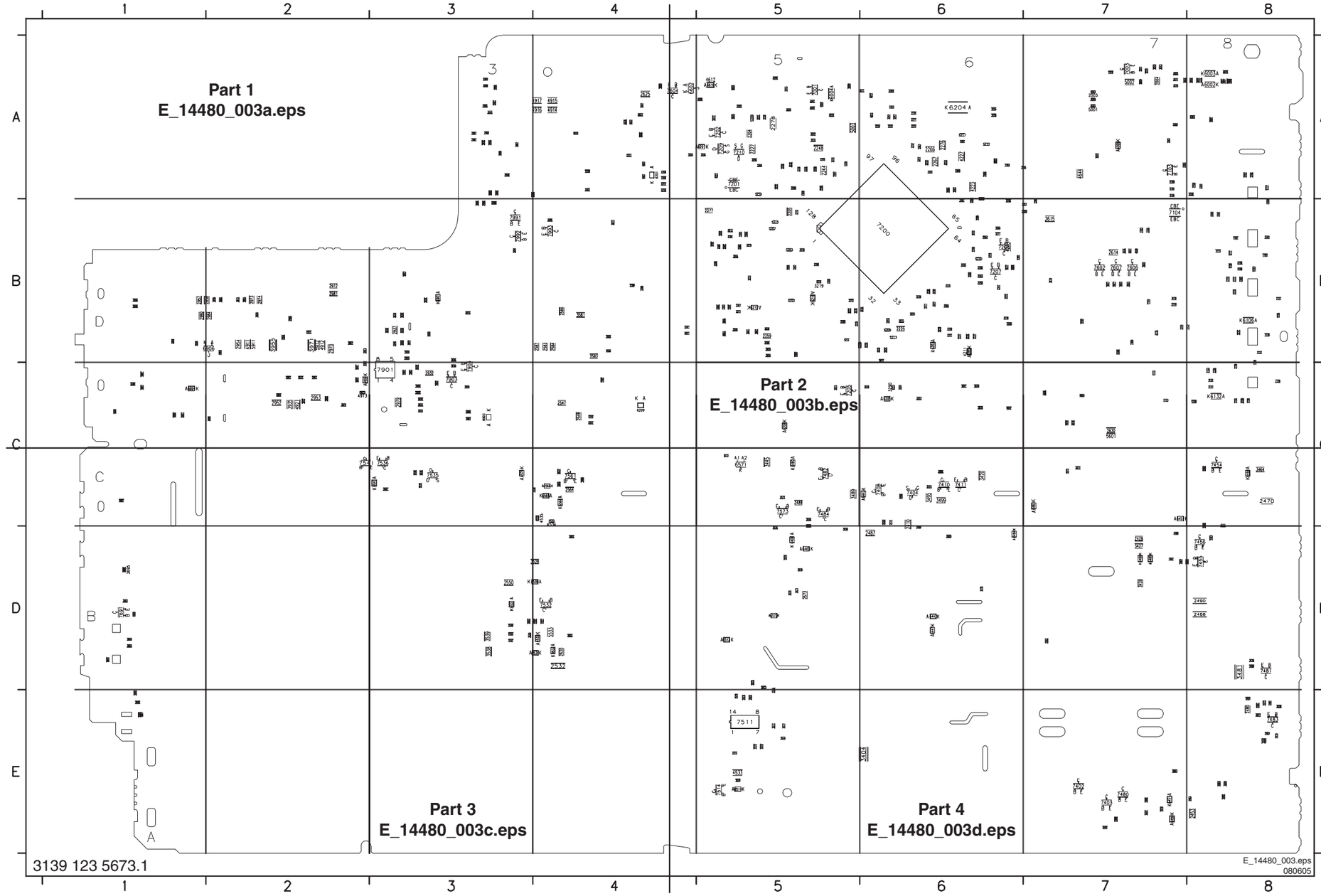
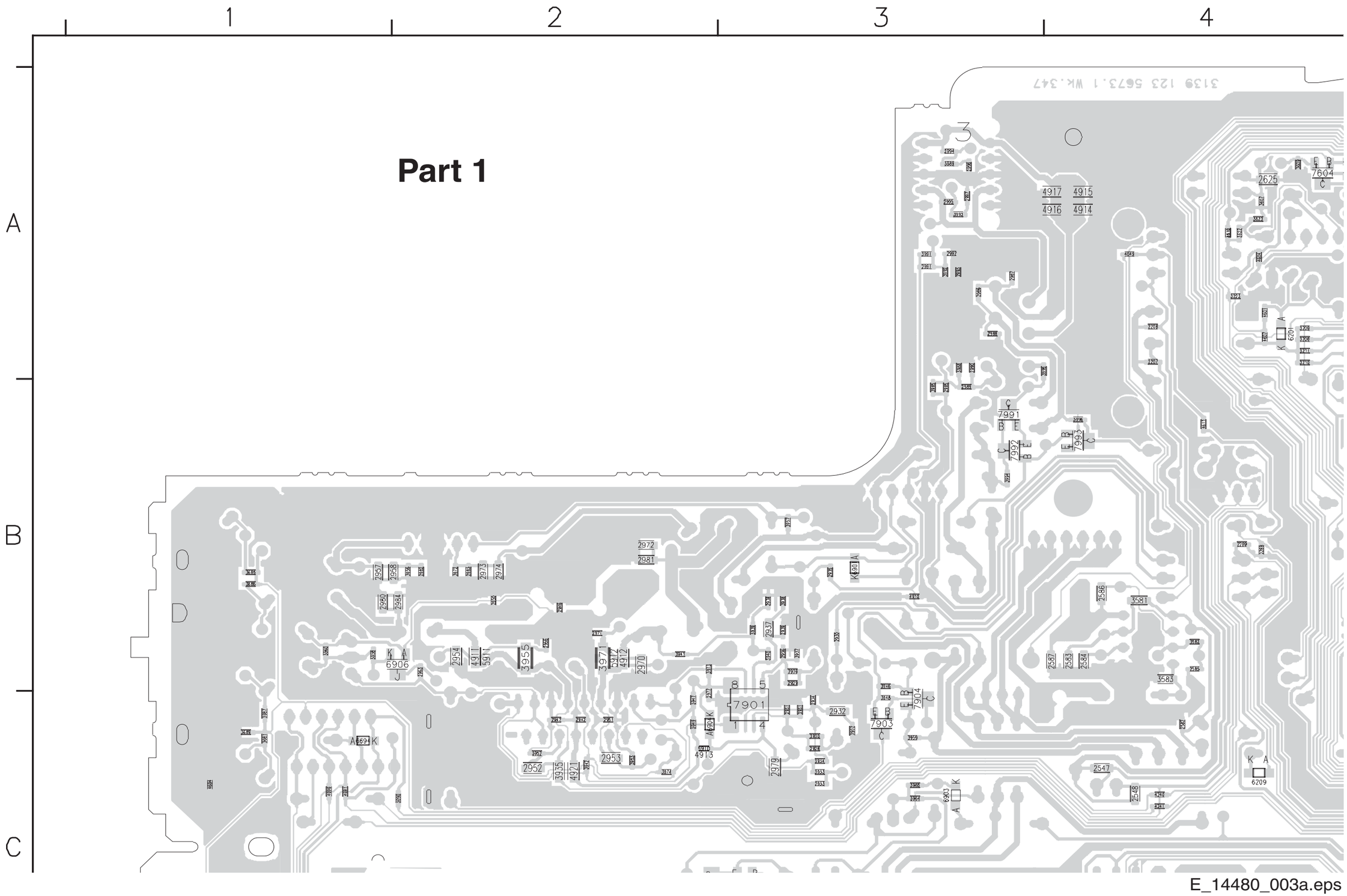
3696 D1 4223 A6 6207 A5 7991 B3
3697 D1 4224 A5 6208 C5 7992 B3
3930 C3 4226 A5 6209 C4 7993 B4
3931 C3 4227 A6 6210 B5
3932 C3 4240 C4 6211 B5
3933 C3 4241 C4 6407 D5
3934 C3 4470 E8 6408 D5
3935 C2 4492 E8 6441 D6
3936 B3 4533 E5 6442 D6
3937 B3 4534 C4 6443 C6
3938 B3 4535 C4 6450 E7
3939 B3 4536 C3 6451 E7
3940 B3 4537 C4 6457 C7
3941 B2 4601 A4 6458 C8
3942 C2 4602 C6 6482 C5
3946 B3 4604 A4 6483 C7
3947 C2 4605 C7 6484 D6
3948 C3 4606 C7 6488 D7
3949 C2 4607 A4 6489 D7
3952 C2 4609 A6 6512 D5
3953 C2 4610 A4 6514 E5
3955 B2 4611 B4 6531 D3



Layout Mono Carrier (Part 1 Bottom Side)



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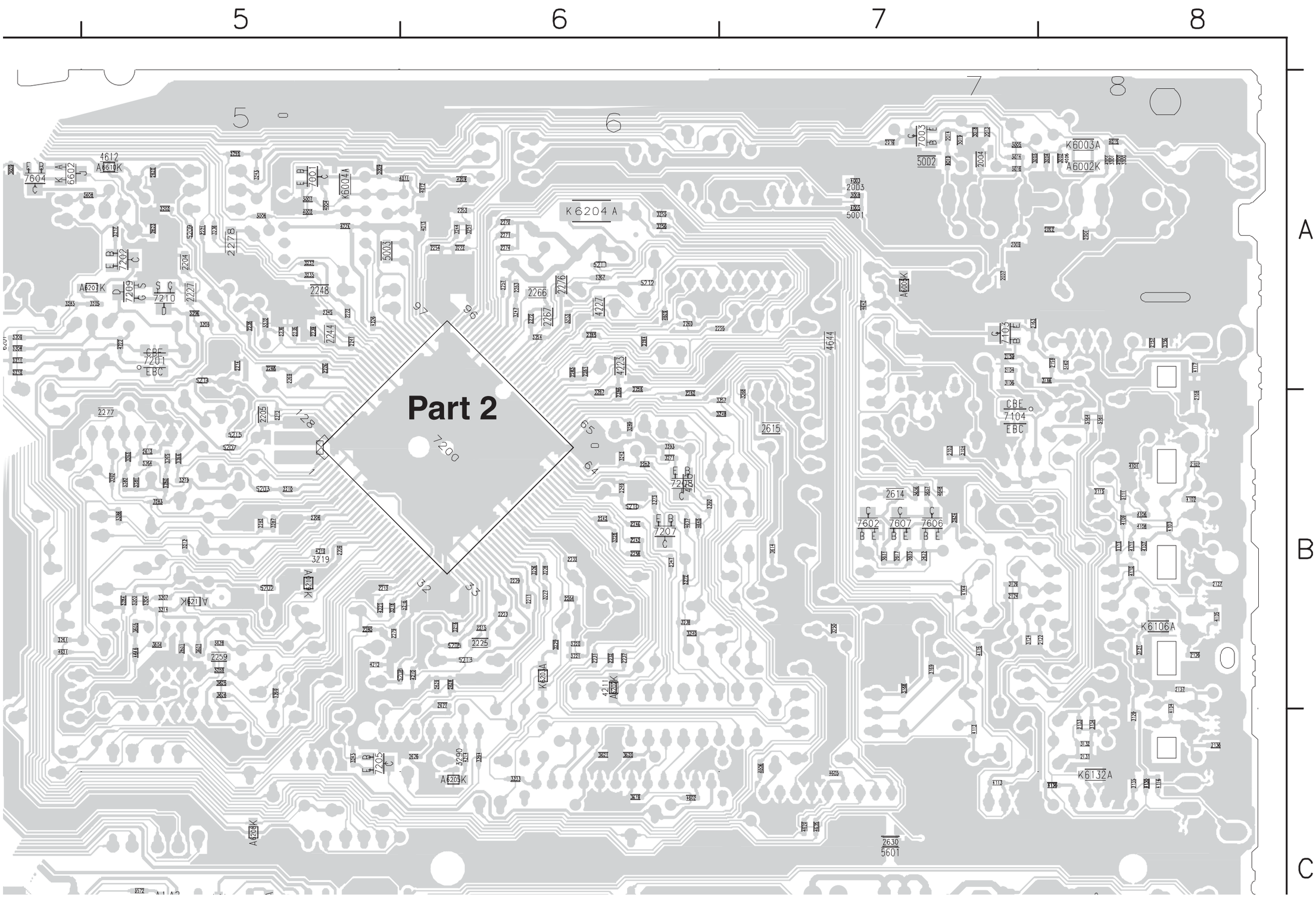
080605

Layout Mono Carrier (Part 2 Bottom Side)



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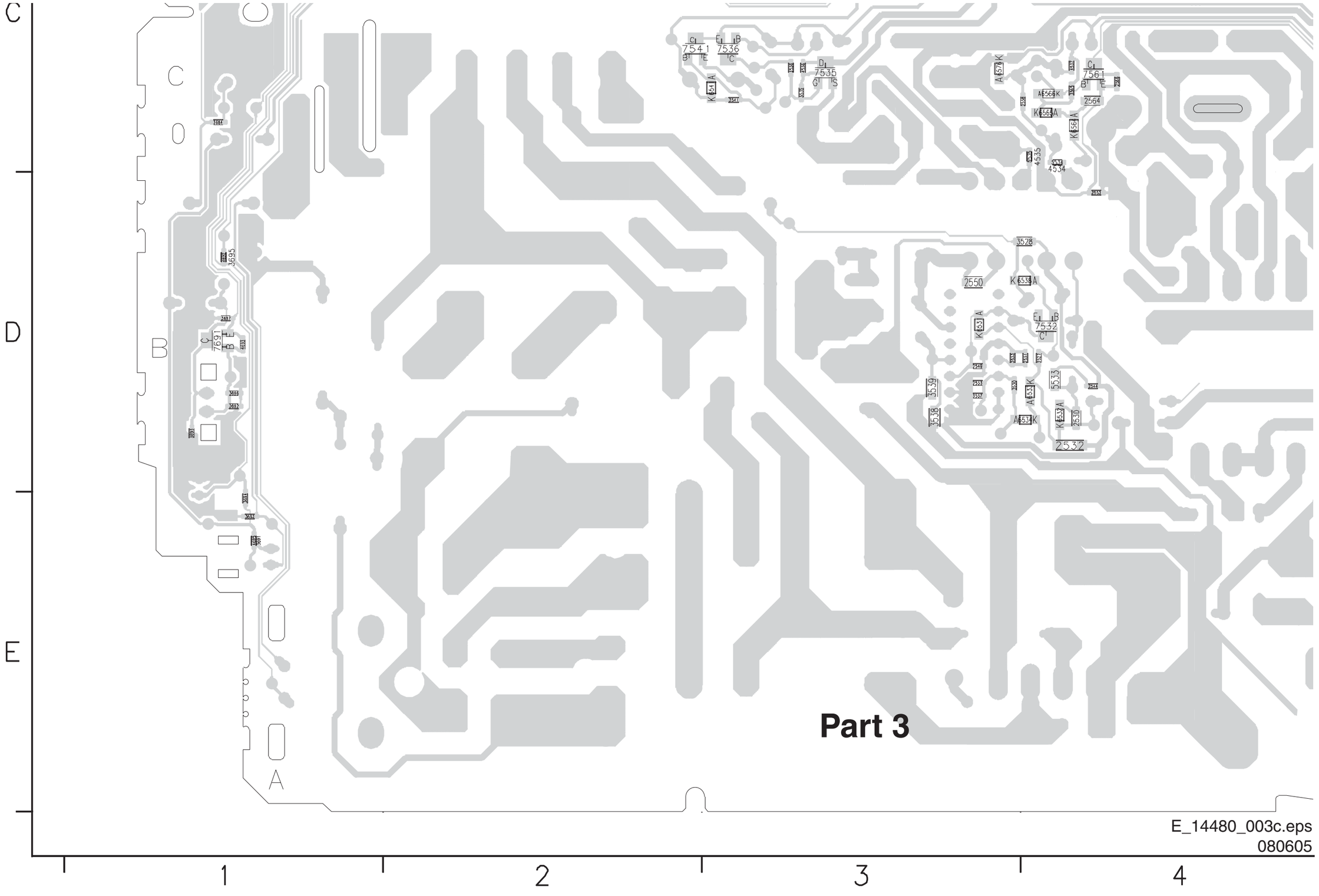
080605

Layout Mono Carrier (Part 3 Bottom Side)



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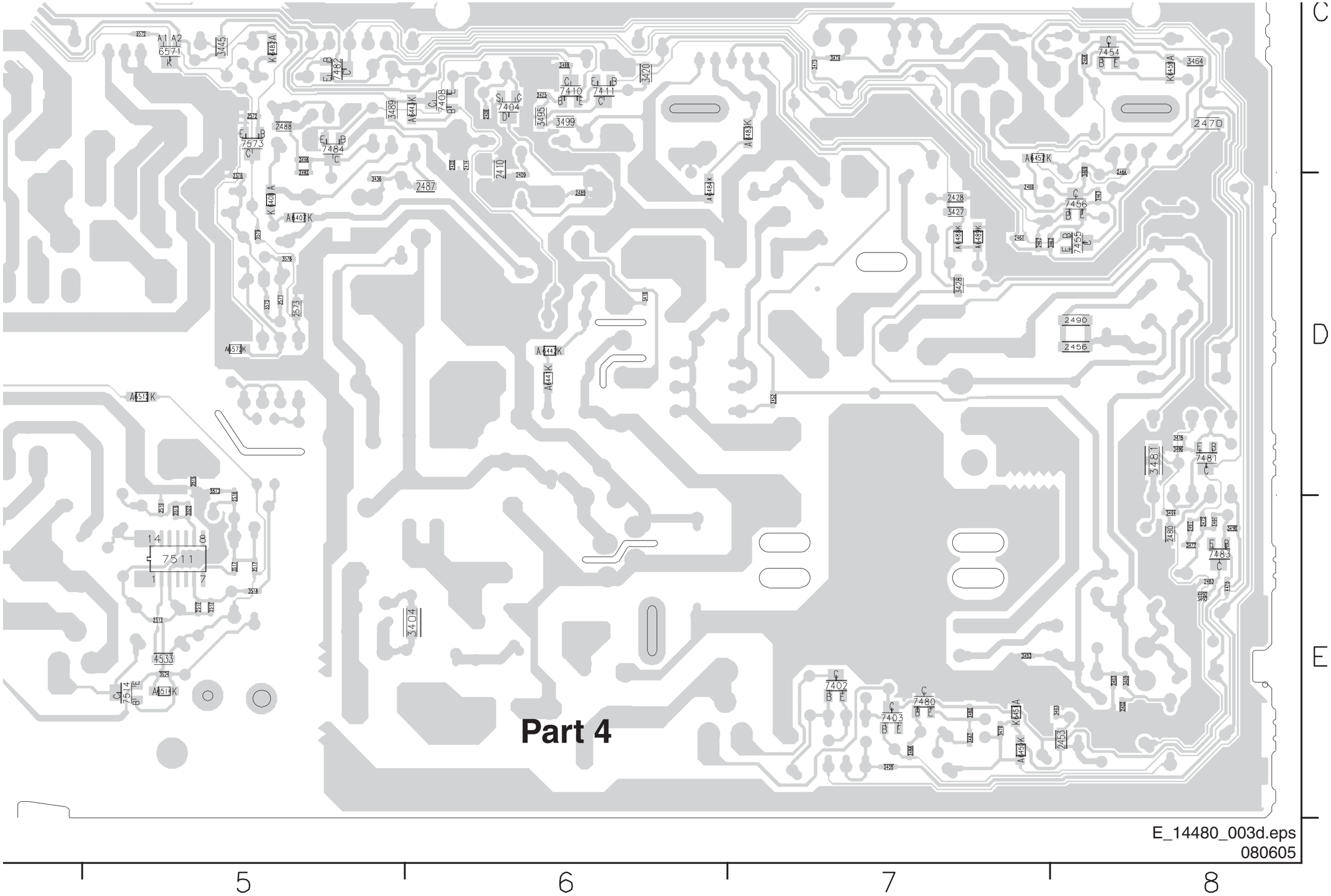
080605

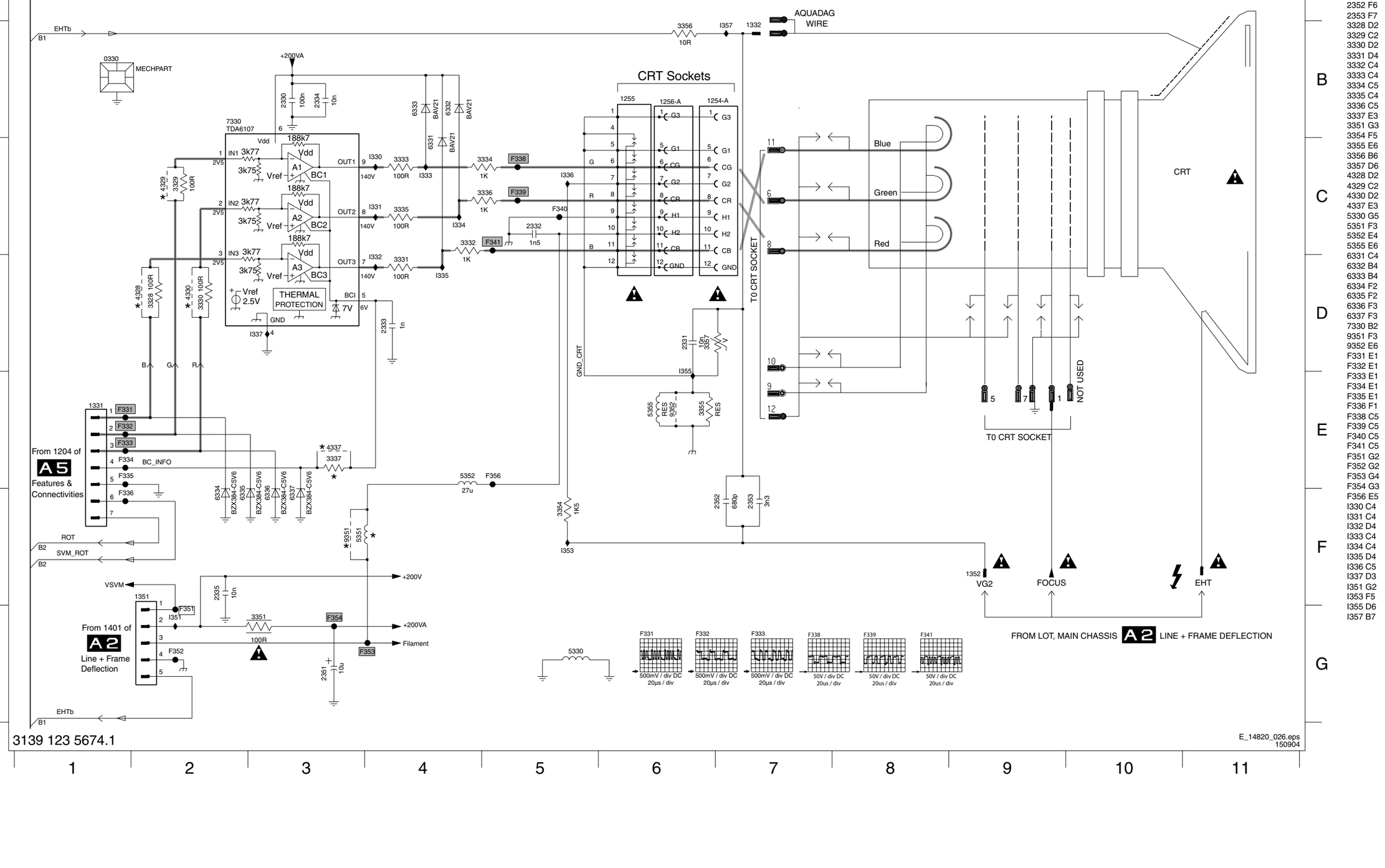
Layout Mono Carrier (Part 4 Bottom Side)



CRT Panel

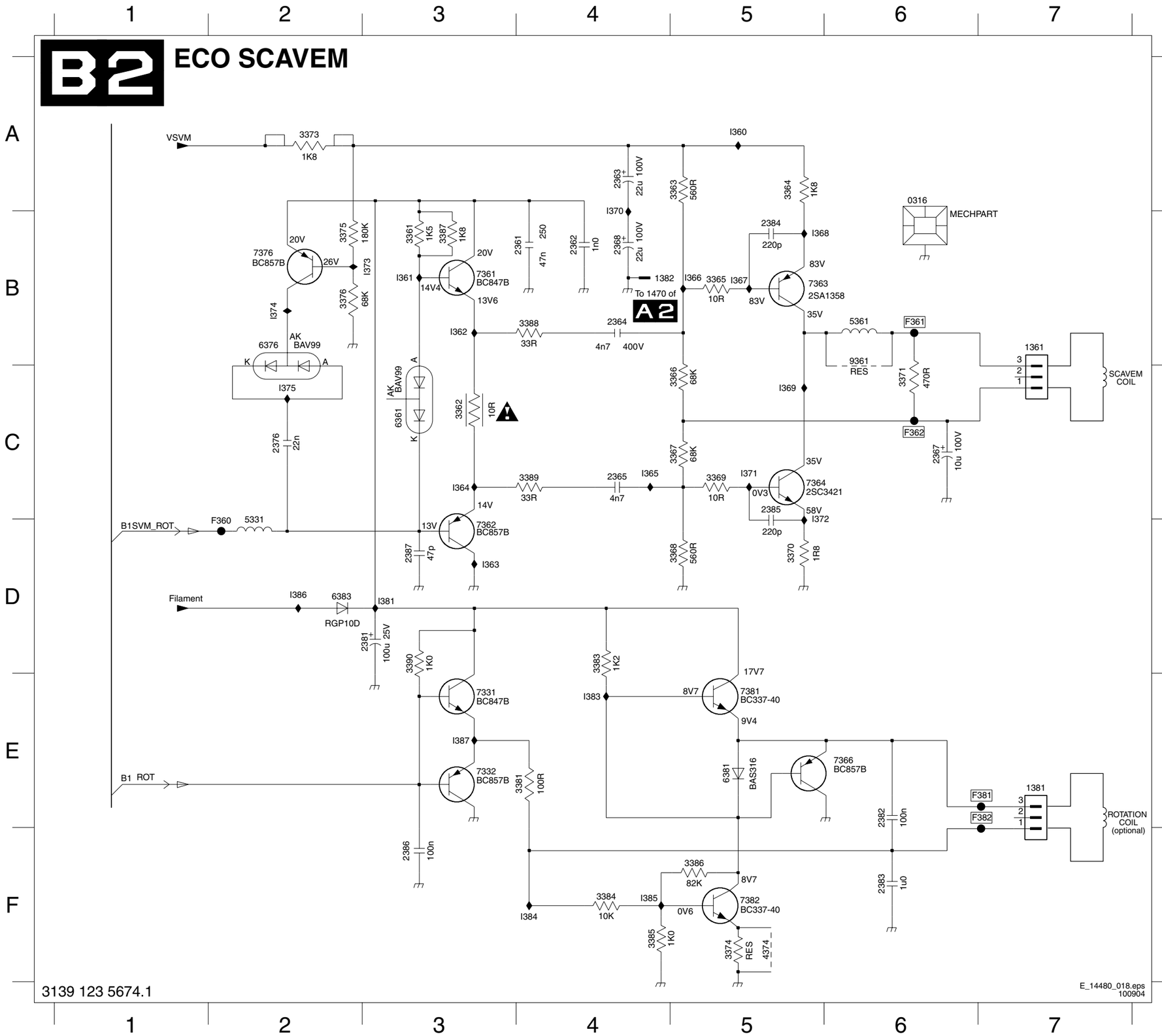
B1 CRT PANEL

ITEM	ROW	
	THE REST	RGB+DISPL-29FS_IN
3328	100R	100R
3329	100R	100R
3330	100R	100R
3337	---	---
4328	---	---
4329	---	---
4330	---	---
4337	---	JMP
5351	IND FXD LAL04A 22U PM10	---
9351	JMP	JMP



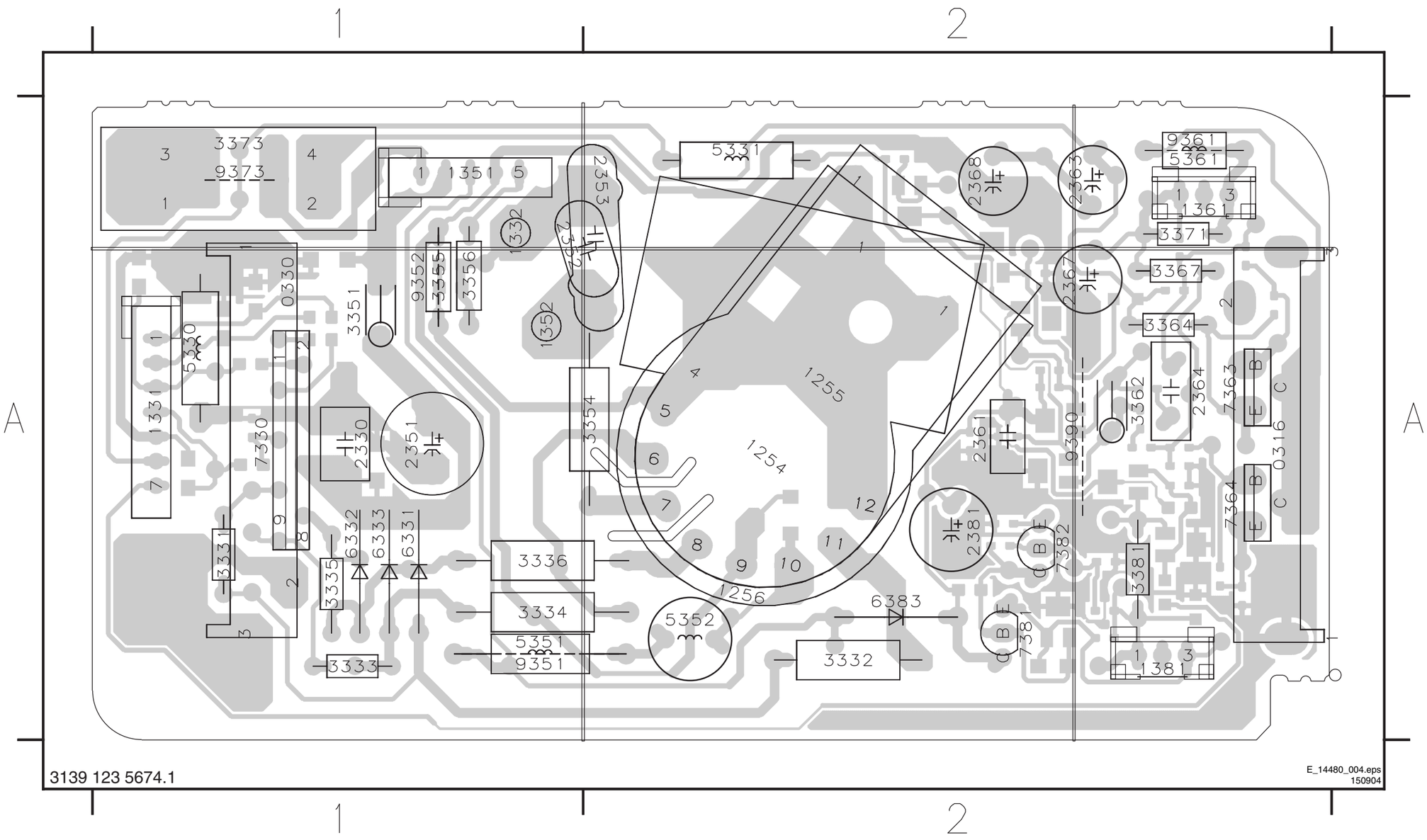
0330 B1
1254-A B7
1255 B6
1256-A B6
1331 E1
1332 B7
1351 F2
1352 F9
2330 B3
2331 D6
2332 C5
2333 D4
2334 B3
2335 F2
2351 G3
2352 F6
2353 F7
3328 D2
3329 C2
3330 D2
3331 D4
3332 C4
3333 C4
3334 C5
3335 C4
3336 C5
3337 E3
3351 G3
3354 F5
3355 E6
3356 B6
3357 D6
4328 D2
4329 C2
4330 D2
4337 E3
5330 G5
5351 F3
5352 E4
5355 E6
6331 C4
6332 B4
6333 B4
6334 F2
6335 F2
6336 F3
6337 F3
7330 B2
9351 F3
9352 E6
F331 E1
F332 E1
F333 E1
F334 E1
F335 E1
F336 F1
F338 C5
F339 C5
F340 C5
F341 C5
F351 G2
F352 G2
F353 G4
F354 G3
F356 E5
I330 C4
I331 C4
I332 D4
I333 C4
I334 C4
I335 D4
I336 C5
I337 D3
I351 G2
I353 F5
I355 D6
I357 B7

CRT Panel: Eco Scavem



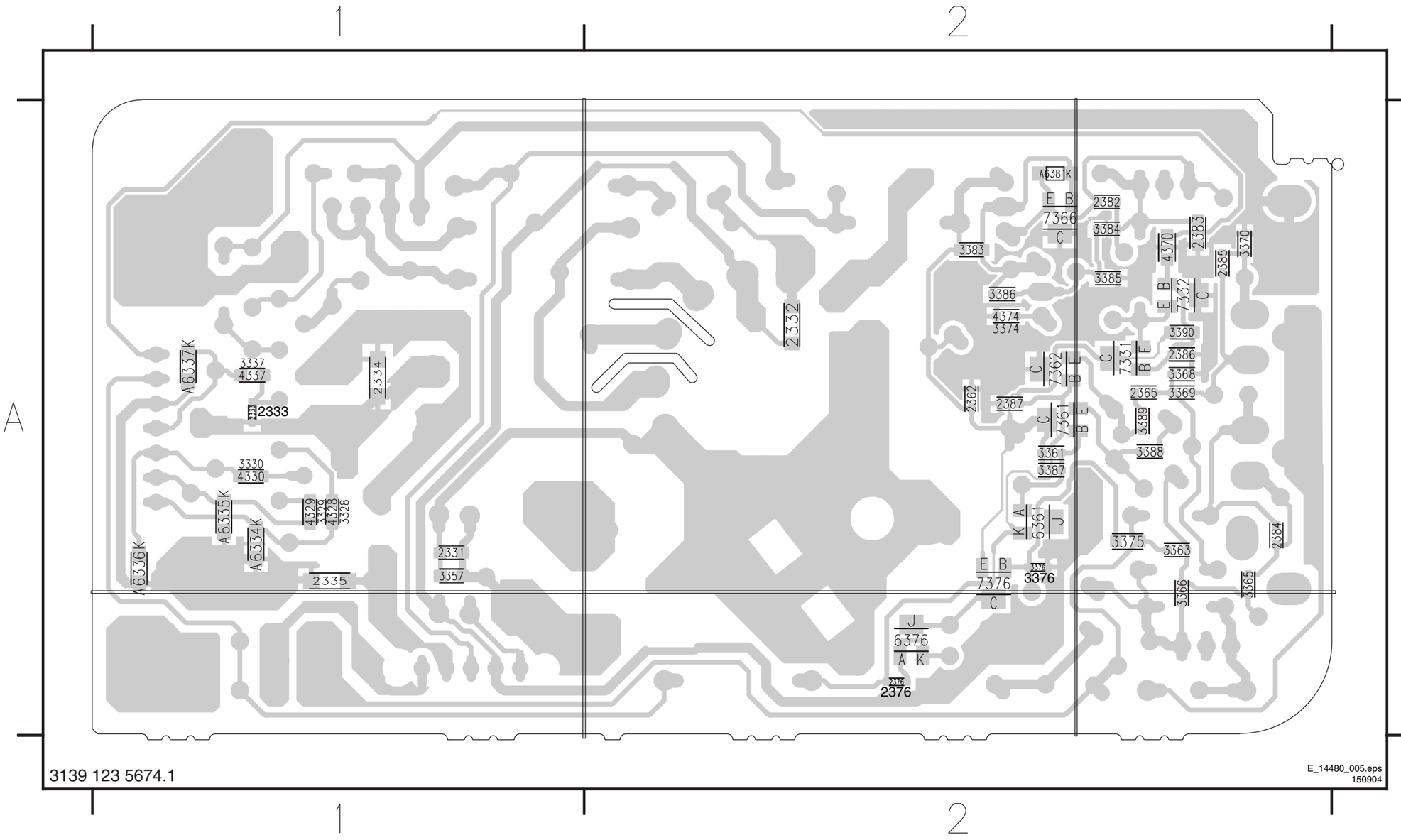
0316 A6
1361 B7
1381 E7
1382 B4
2361 B4
2362 B4
2363 A4
2364 B4
2365 C4
2367 C6
2368 B4
2376 C2
2381 D3
2382 E6
2383 F6
2384 B5
2385 C5
2386 F3
2387 D3
3361 B3
3362 C3
3363 A5
3364 A5
3365 B5
3366 C5
3367 C5
3368 D5
3369 C5
3370 D5
3371 C6
3373 A2
3374 F5
3375 B2
3376 B2
3381 E4
3383 D4
3384 F4
3385 F4
3386 F5
3387 B3
3388 B4
3389 C4
3390 D3
4374 F5
5331 D2
5361 B6
6361 C3
6376 B2
6381 E5
6383 D2
7331 E3
7332 E3
7361 B3
7362 D3
7363 B5
7364 C5
7366 E6
7376 B2
7381 E5
7382 F5
9361 B6
F360 D2
F361 B6
F362 C6
F381 E7
F382 E7
I360 A5
I361 B3
I362 B3
I363 D3
I364 C3
I365 C4
I366 B5
I367 B5
I368 B5
I369 C5
I370 A4
I371 C5
I372 C5
I373 B3
I374 B2
I375 C2
I381 D3
I383 E4
I384 F4
I385 F5
I386 D2
I387 E3

Layout CRT Panel (Top Side)



0316	A2	5352	A2
0330	A1	5361	A2
1254	A2	6331	A1
1255	A2	6332	A1
1256	A2	6333	A1
1331	A1	6383	A2
1332	A1	7330	A1
1351	A1	7363	A2
1352	A1	7364	A2
1361	A2	7381	A2
1381	A2	7382	A2
2330	A1	9351	A1
2351	A1	9352	A1
2352	A1	9361	A2
2353	A2	9373	A1
2361	A2	9390	A2
2363	A2		
2364	A2		
2367	A2		
2368	A2		
2381	A1		
3331	A1		
3332	A2		
3333	A1		
3334	A1		
3335	A1		
3336	A1		
3351	A1		
3354	A2		
3355	A1		
3356	A1		
3362	A2		
3364	A2		
3367	A2		
3371	A2		
3373	A1		
3381	A2		
5330	A1		
5331	A2		
5351	A1		

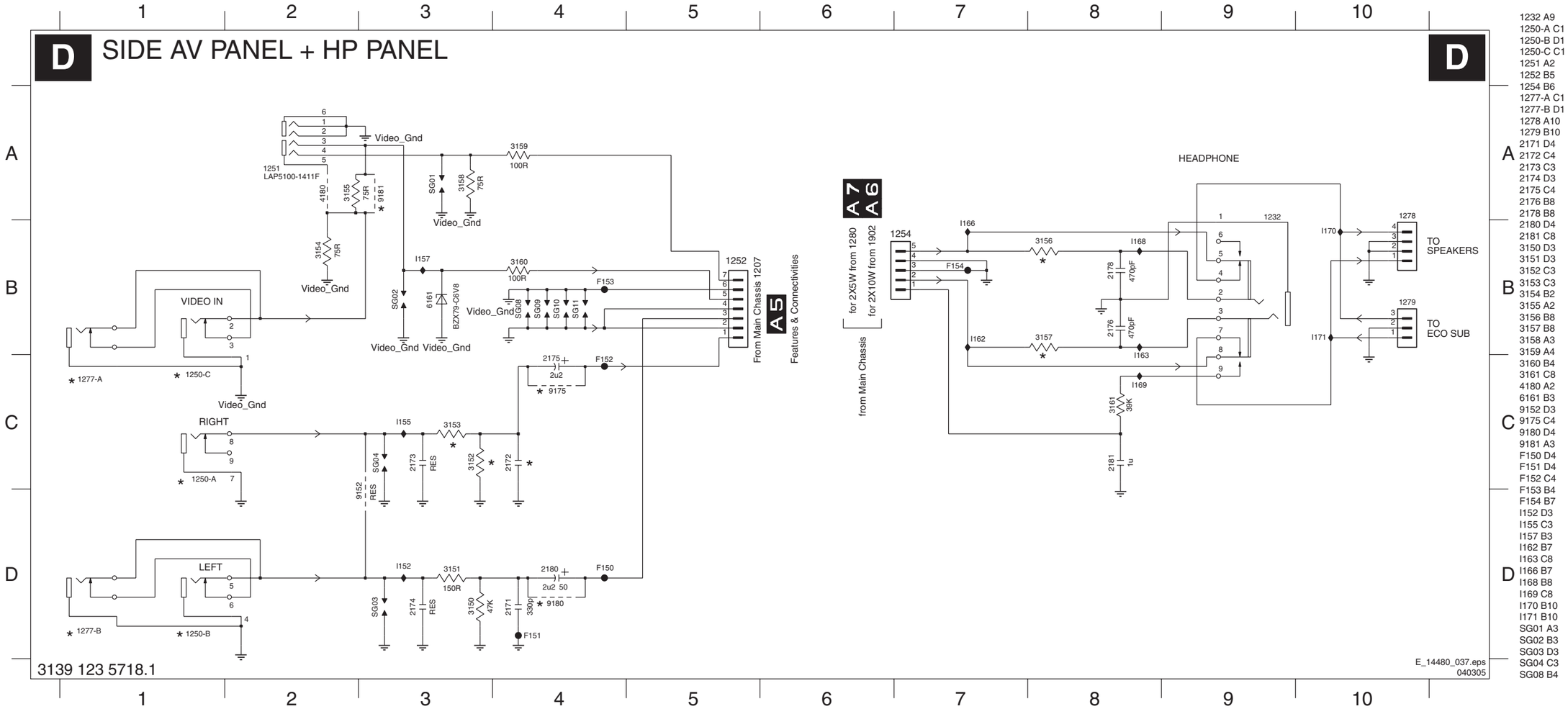
Layout CRT Panel (Bottom Side)



2331 A1
2332 A2
2333 A1
2334 A1
2335 A1
2362 A2
2365 A2
2376 A2
2382 A2
2383 A2
2384 A2
2385 A2
2386 A2
2387 A2
3328 A1
3329 A1
3330 A1
3337 A1
3357 A1
3361 A2
3363 A2
3365 A2
3366 A2
3368 A2
3369 A2
3370 A2
3374 A2
3375 A2
3376 A2
3383 A2
3384 A2
3385 A2
3386 A2
3387 A2
3388 A2
3389 A2
3390 A2
4328 A1
4329 A1
4330 A1
4337 A1
4370 A2
4374 A2
6334 A1
6335 A1
6336 A1
6337 A1
6361 A2
6376 A2
6381 A2
7331 A2
7332 A2
7361 A2
7362 A2
7366 A2
7376 A2

Side AV + Headphone Panel

SIDE AV PANEL + HP PANEL



3139 123 5718.1

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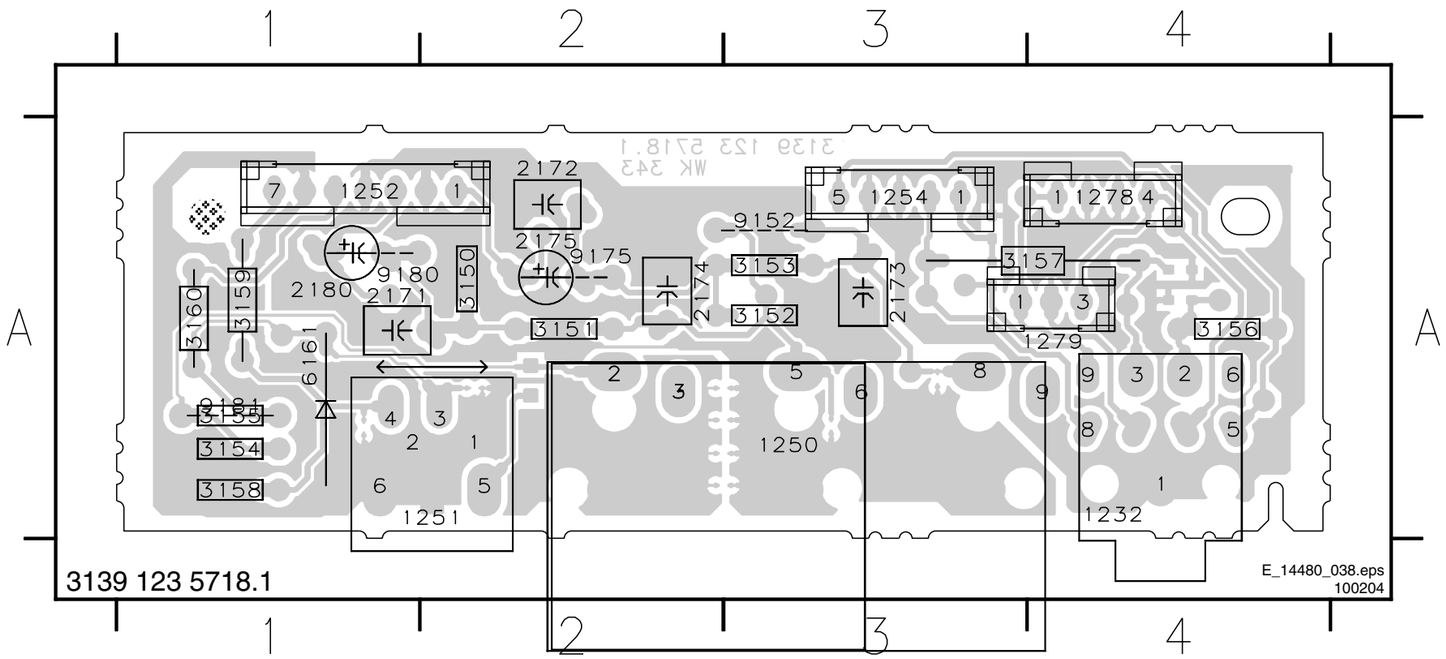
040305

1232 A9
1250-A C1
1250-B D1
1250-C C1
1251 A2
1252 B5
1254 B6
1277-A C1
1277-B D1
1278 A10
1279 B10
2171 D4
2172 C4
2173 C3
2174 D3
2175 C4
2176 B8
2178 B8
2180 D4
2181 C8
3150 D3
3151 D3
3152 C3
3153 C3
3154 B2
3155 A2
3156 B8
3157 B8
3158 A3
3159 A4
3160 B4
3161 C8
4180 A2
6161 B3
9152 D3
9175 C4
9180 D4
9181 A3
F150 D4
F151 D4
F152 C4
F153 B4
F154 B7
I152 D3
I155 C3
I157 B3
I162 B7
I163 C8
I166 B7
I168 B8
I169 C8
I170 B10
I171 B10
SG01 A3
SG02 B3
SG03 D3
SG04 C3
SG08 B4
SG09 B4
SG10 B4
SG11 B4

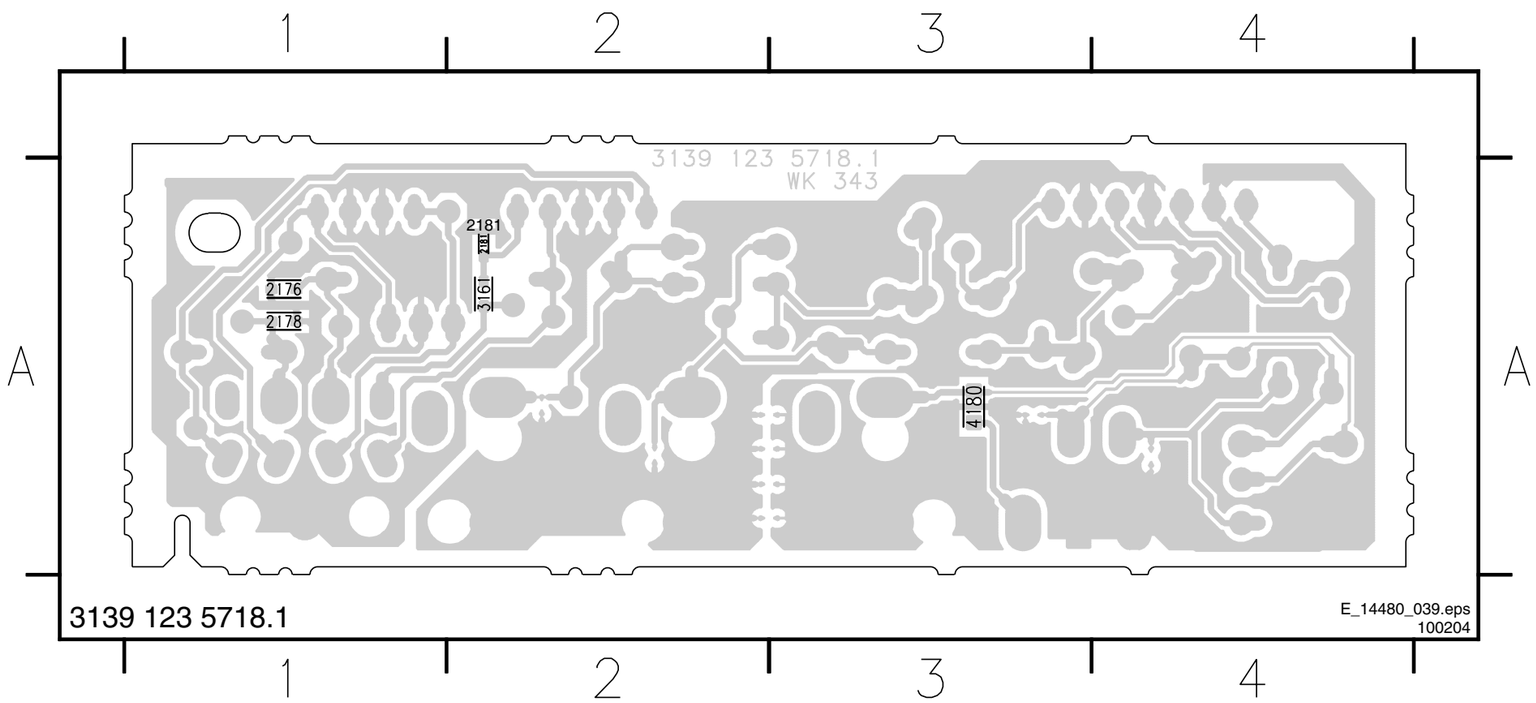
Layout Side AV + Headphone Panel (Top Side)

1232 A4	1254 A3	2171 A1	2175 A2	3152 A3	3156 A4	3160 A1	9180 A1
1250 A3	1277 A2	2172 A2	2180 A1	3153 A3	3157 A4	6161 A1	9181 A1
1251 A2	1278 A4	2173 A3	3150 A2	3154 A1	3158 A1	9152 A3	
1252 A1	1279 A4	2174 A2	3151 A2	3155 A1	3159 A1	9175 A2	



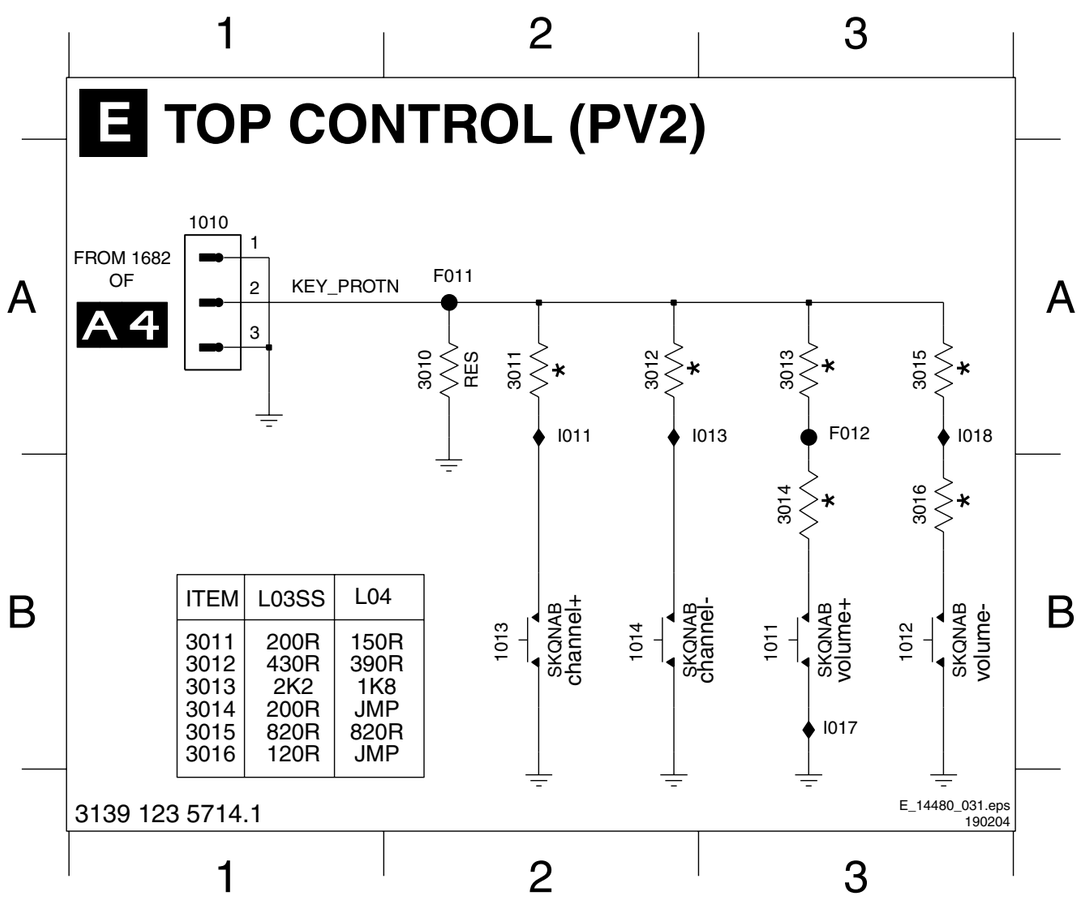
Layout Side AV + Headphone Panel (Bottom Side)

2176 A1	2178 A1	2181 A2	3161 A2	4180 A3			

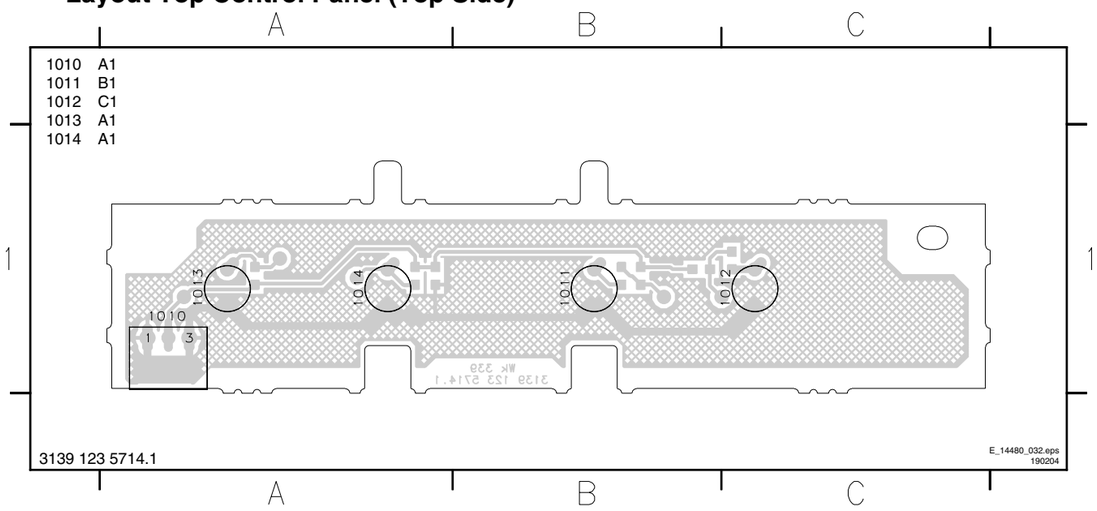


Top Control Panel

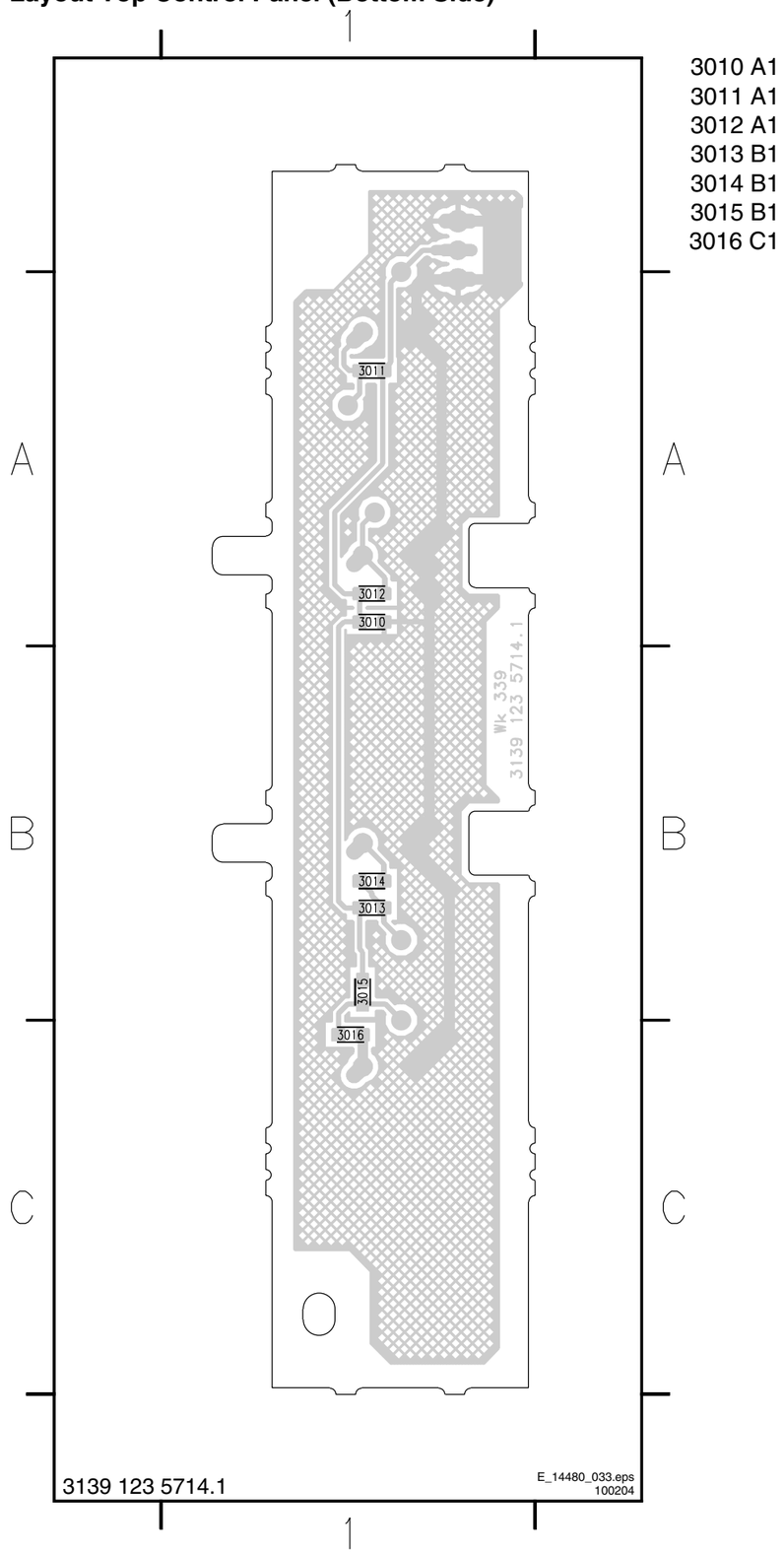
1010 A1 1012 B3 1014 B2 3011 A2 3013 A3 3015 A3 F011 A2 I011 A2 I017 B3
1011 B3 1013 B2 3010 A2 3012 A2 3014 B3 3016 B3 F012 A3 I013 A3 I018 A3



Layout Top Control Panel (Top Side)



Layout Top Control Panel (Bottom Side)



EPS 4 (External Power Supply)

EPS 4B (External Power Supply)

F

To 0211 A1 (Power Supply)

0211 CON1 (L 1, N 2)

0213 CON2 (L 1, N 2)

1A/250V F1

UU9.8 22MH L2

UU9.8 22MH L1

C1 0.1UF/275VAC

C12 0.01UF/1KV

R4 1.5M(1/2W)

BR1 1A 600V

R2 7.5M

R1

* ZD2 for EPS4B

* ZD2 5W 400V

C5 33UF/450V

DC+

T1 EE16

43R R23 0.001UF/1KV C24

CR3 3A 100V

CR4 3A 100V

C11 330UF/25V

0.001UF/1KV

IC4 KA278R12

C35 470UF/25V

RH-3.5*0.8*9 L8

D4 1A 100V

CON3 (5 +3.3V, 4 Gnd, 3 +12V, 2 Gnd, 1 +5V) 0228

R27 43R C25

CR1 5A 40V

CR2 5A 40V

680UF/10V C7

IC5 KA278R05

L7 RH-3.5*0.8*9

D5 1A 100V

C23 470UF/10V

DR6*8 16UH

C36 0.1UF/50V

C39 220UF/10V

RH-3.5*0.8*9 L10

0.001UF/1KV

R28 43R C26

D3 10A 30V

470UF/10V C27

L9

C38 470UF/10V

R26 100R(1/4W)

G1

G

R29 560R

R13 510R

C28 0.001UF/1KV

ZD1 5W 180V

D1 1A 600V

IC1 TOP233Y

R3 13K

L6 RH3.5*0.8*4.7

D2 250mA 200V

R12 22R

C21 0.1UF/50V

TLP721 IC2

C29 0.22UF/50V

R14 2K

IC3 AN1431

R16 10K

R25 3.3K

R11 22R

C20 0.1UF/50V

C6 47UF/16V

C2 470PF/ 250V

HOT Ground

COLD Ground

To 0228 J (Interface)

To Ground Pin 0285 of Main Chassis

3139 137 2388.3

E_14820_061.eps 151204

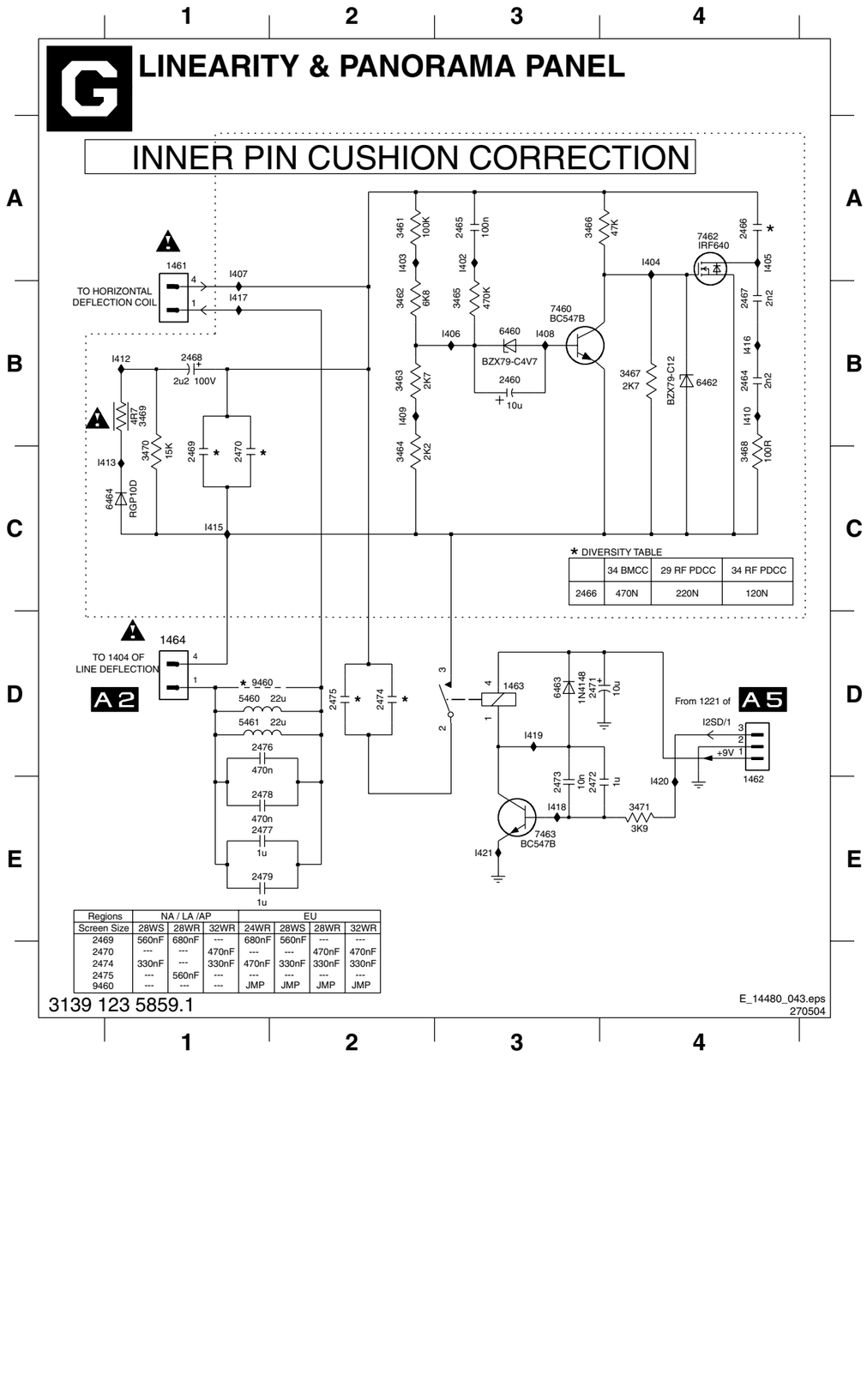
Layout EPS 4 (External Power Supply)

3139 137 2388.3

E_14820_062.eps
151204

211 F3
213 F4
228 A1
BR1
D4
C1 D3
C2 C1
C5 C4
C6 C1
C7 B3
C11 B3
C12 D2
C20 C1
C21 C1
C23 A3
C24 B3
C25 B3
C26 B2
C27 B2
C28 D3
C29 B2
C35 A3
C36 A2
C38 B2
C39 A2
CR1
B3
CR2
B3
CR3
B4
CR4
B4
D1 D3
D2 C2
D3 B2
D4 A1
D5 A2
F1 E3
G1 A2
IC1 C2
IC2 B2
IC3 B1
IC4 A4
IC5 A3
J1 A4
L1 D4
L2 D2
L6 C2
L7 A2
L8 A2
L9 B2
L10 B1
R1 C3
R2 C2
R3 C2
R4 D4
R11 C1
R12 C2
R13 B3
R13 B3
R14 B1
R16 B1
R23 B4
R25 B2
R26 B2
R27 B3
R28 B3
R29 B3
ZD1 D3
ZD2 C3

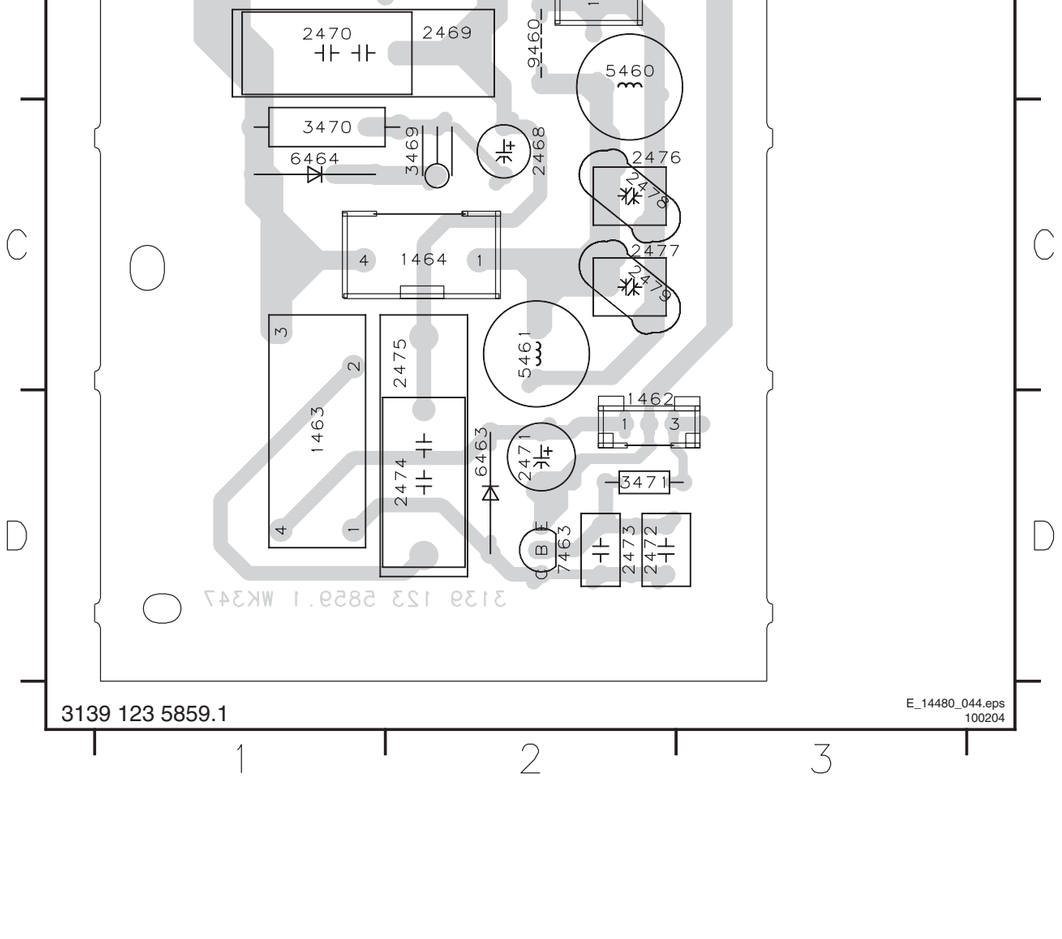
Linearity & Panorama Panel



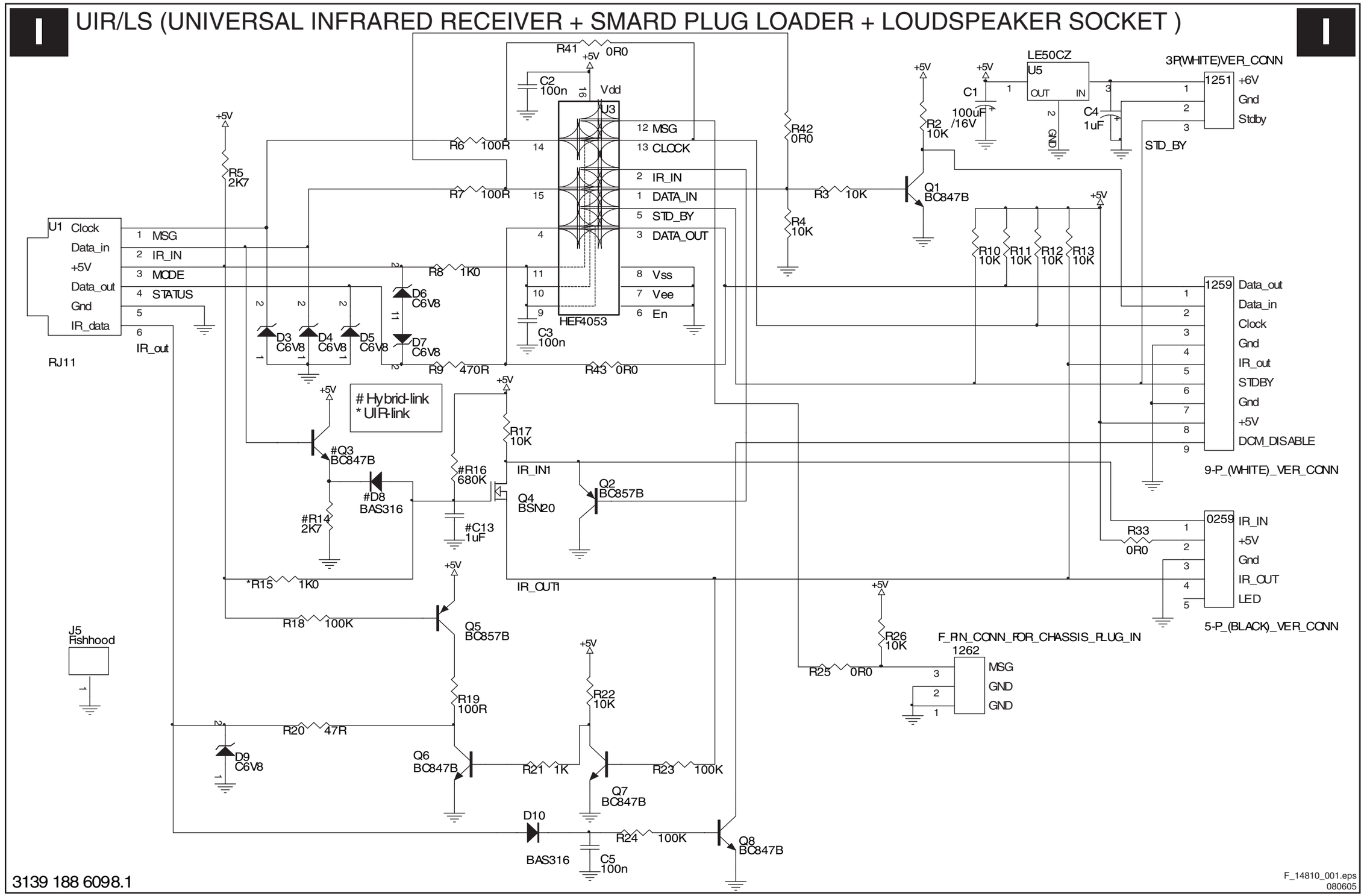
1461 A1
1462 D4
1463 D3
1464 D1
2460 B3
2464 B4
2465 A3
2466 A4
2467 B4
2468 B1
2469 C1
2470 C1
2471 D3
2472 E3
2473 E3
2474 D2
2475 D2
2476 D1
2477 E1
2478 E1
2479 E1
3461 A2
3462 B2
3463 B2
3464 C2
3465 B3
3466 A3
3467 B4
3468 C4
3469 B1
3470 C1
3471 E4
5460 D1
5461 D1
6460 B3
6462 B4
6463 D3
6464 C1
7460 B3
7462 A4
7463 E3
9460 D1
I402 A3
I403 A2
I404 A4
I405 A4
I406 B3
I407 A1
I408 B3
I409 B2
I410 B4
I412 B1
I413 C1
I415 C1
I416 B4
I417 B1
I418 E3
I419 D3
I420 E4
I421 E3

Layout Linearity & Panorama Panel (Top Side)

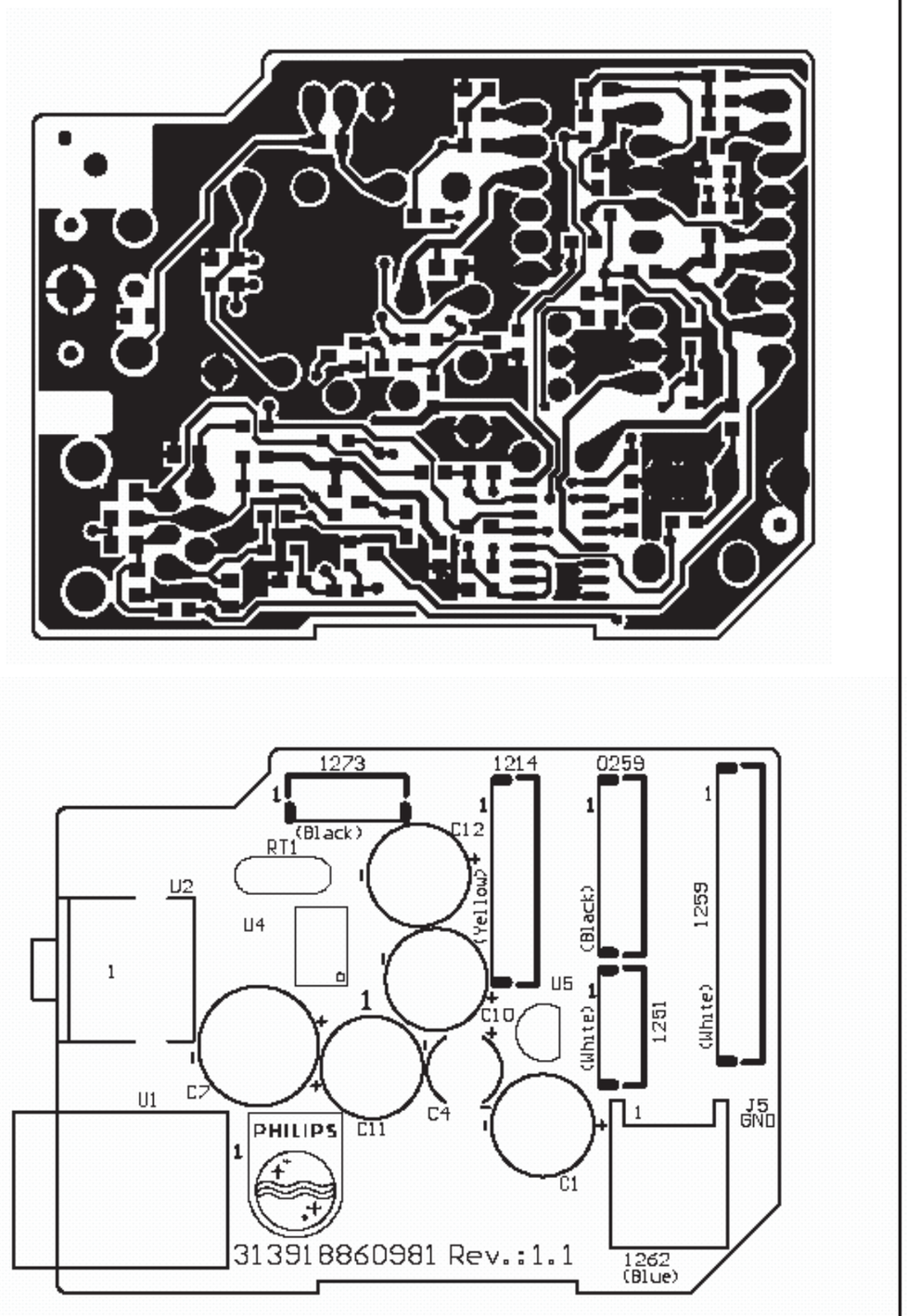
1461 B2 2464 B2 2469 B2 2474 D2 2479 C2 3465 B1 3470 C1 6461 A2 7462 D2
1462 D2 2465 B1 2470 B1 2475 C2 3461 B2 3466 B2 3471 D2 6462 D2 9460 B2
1463 D1 2466 B2 2471 D2 2476 C2 3462 B1 3467 A2 5460 B2 6463 C1
1464 C2 2467 A2 2472 D2 2477 C2 3463 B1 3468 A2 5461 C2 7460 A1
2460 A1 2468 C2 2473 D2 2478 C2 3464 B1 3469 C2 6460 A1 7461 A2



UIR SP External Speakers Panel



Layout UIR SP External Speakers Panel (Top Side)



3139 188 6098.1

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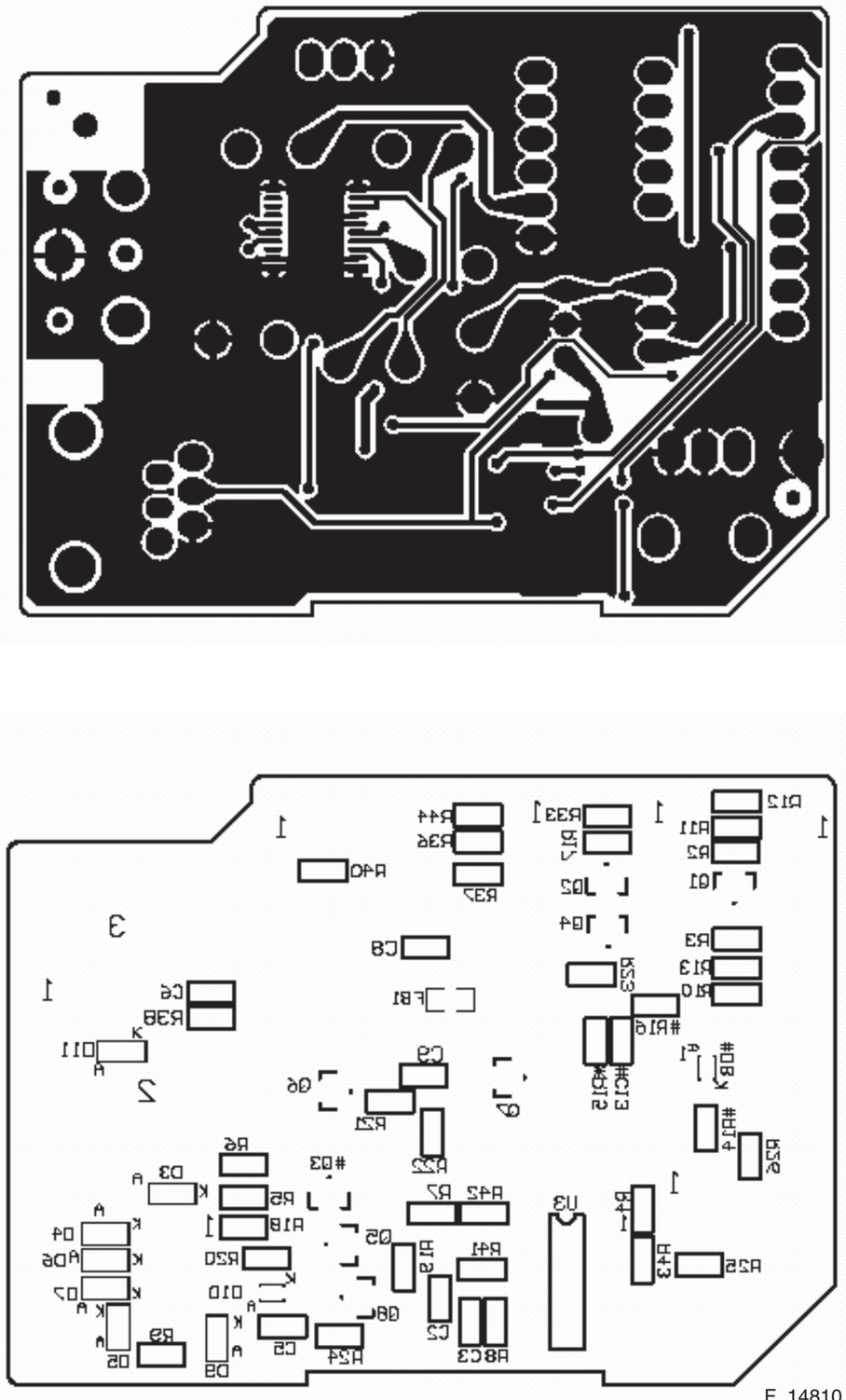
Layout UIR SP External Speakers Panel (Bottom Side)



3139 188 6098.1

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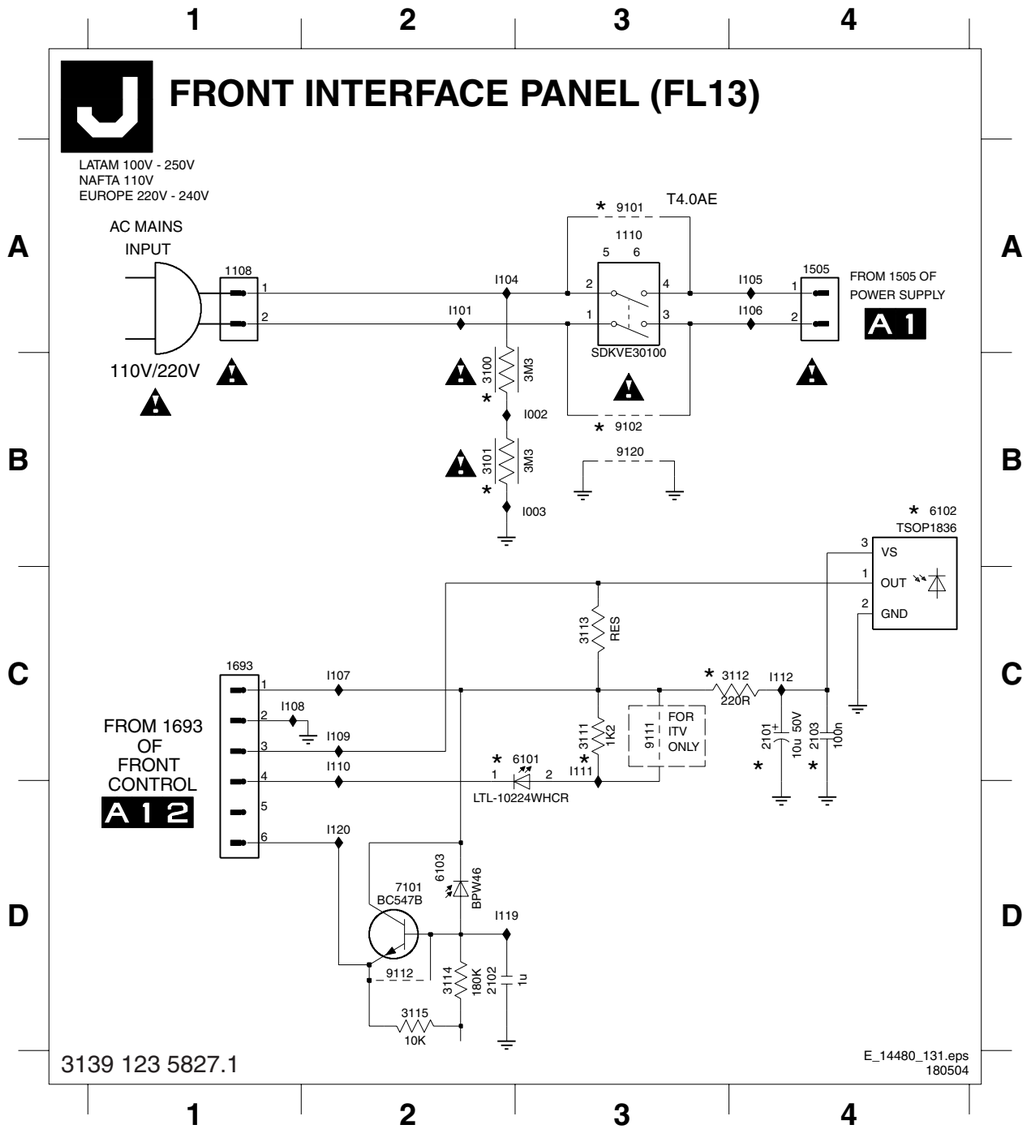
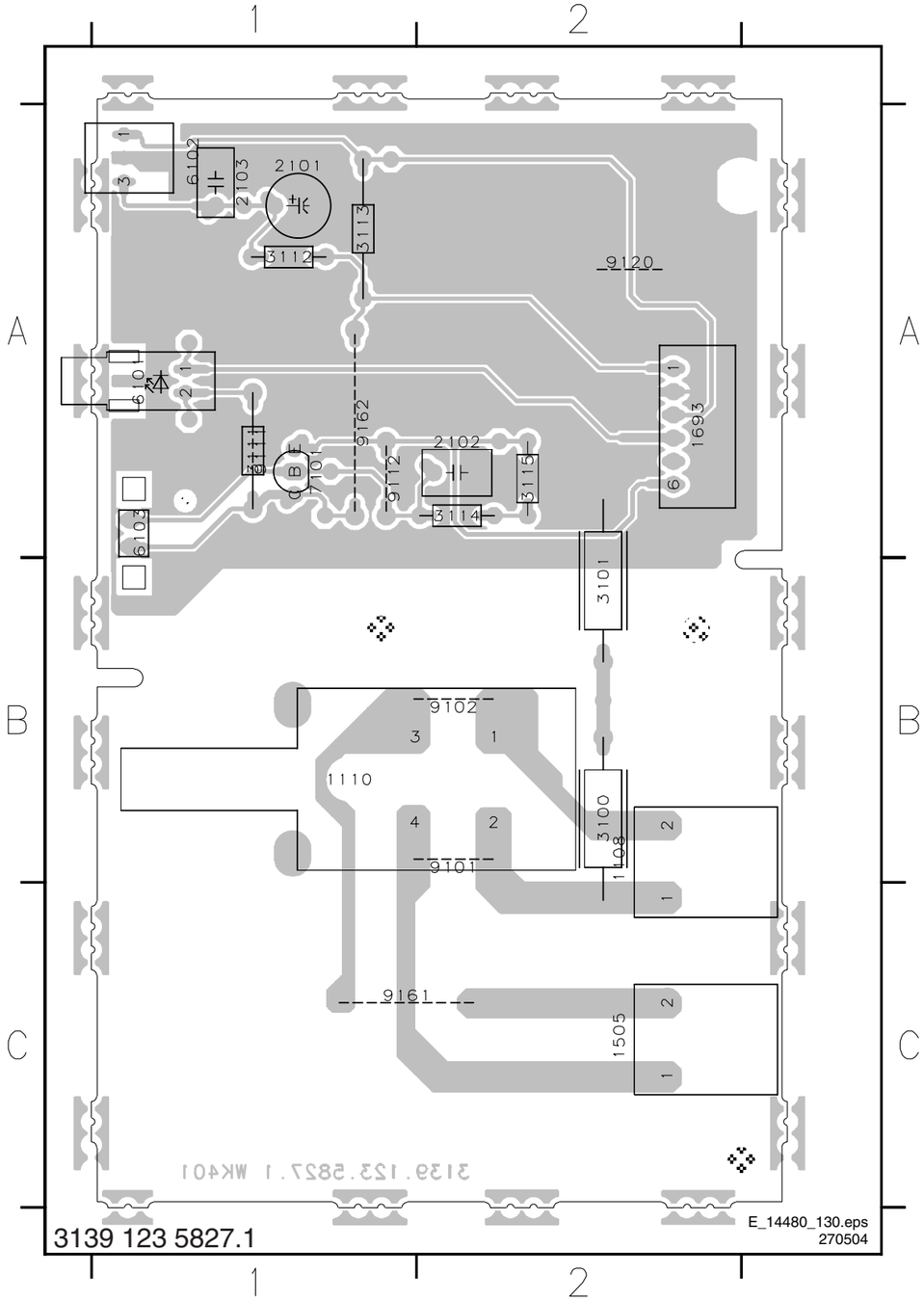
080605

Front Interface Panel (FL-13)



1108 A1
1110 A3
1505 A4
1693 C1
2101 C4
2102 D2
2103 C4
3100 B2
3101 B2
3111 C3
3112 C4
3113 C3
3114 D2
3115 D2
6101 C3
6102 B4
6103 D2
7101 D2
9101 A3
9102 B3
9111 C3
9112 D2
9120 B3
I002 B3
I003 B3
I101 A2
I104 A2
I105 A4
I106 A4
I107 C2
I108 C1
I109 C2
I110 C2
I111 C3
I112 C4
I119 D2
I120 D2

Layout Front Interface Panel (FL-13) (Top Side)



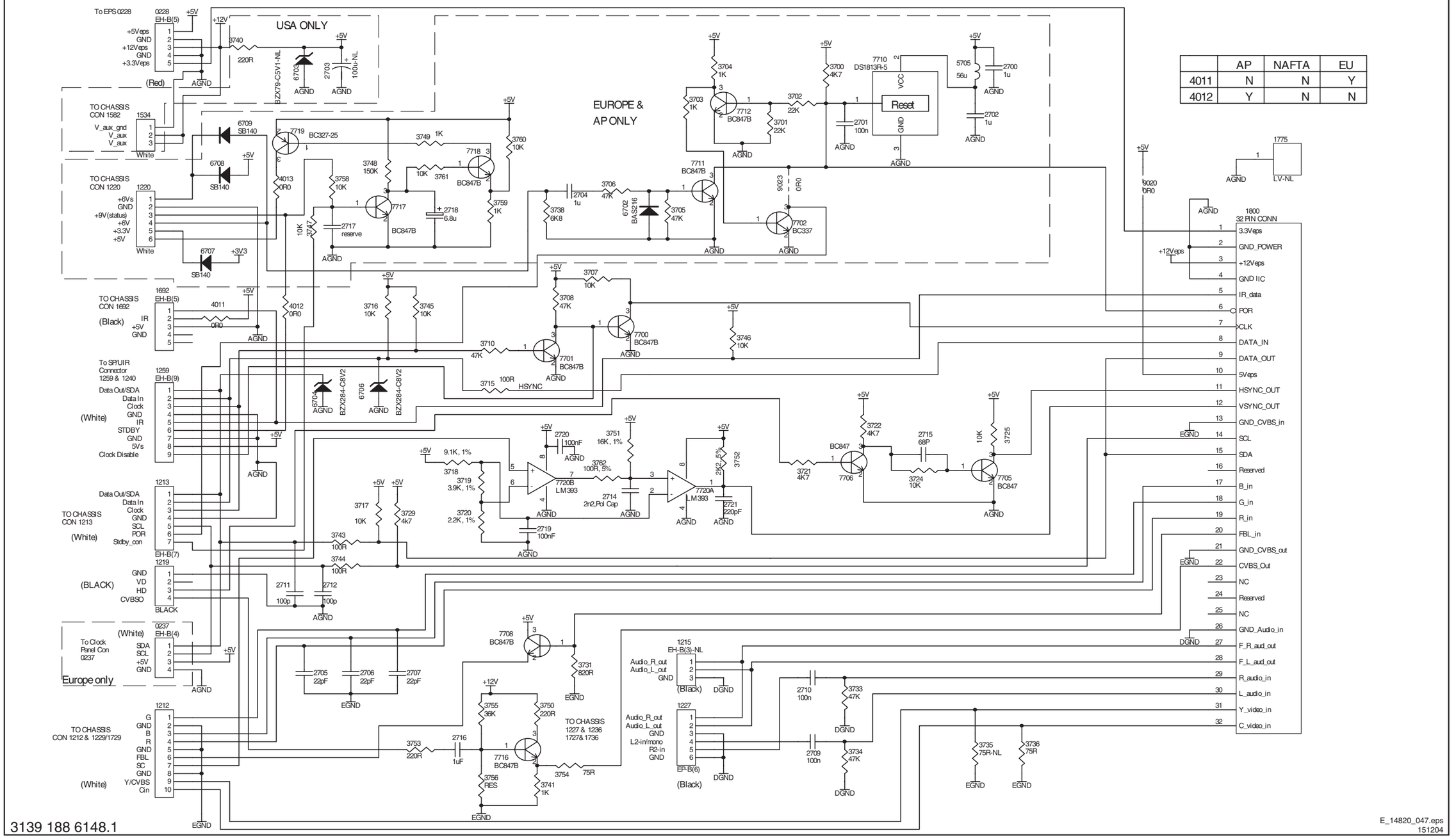
1108 B2
1110 B1
1505 C2
1693 A2
2101 A1
2102 A2
2103 A1
3100 B2
3101 B2
3111 A1
3112 A1
3113 A1
3114 A2
3115 A2
6101 A1
6102 A1
6103 A1
7101 A1
9101 B2
9102 B2
9111 A1
9112 A1
9120 A2
9161 C1
9162 A1

Interface Module

J1 INTERFACE MODULE

J1

	AP	NAFTA	EU
4011	N	N	Y
4012	Y	N	N



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Interface Module: Diversity Table Part 1

J1 INTERFACE MODULE

J1

Partlist Diversity Table

S/N	Component 12NC	Comp. Description	Interface Module - NA 3139 188 61471 Item number	Interface Module - AP 3139 188 61491 Item number	Interface Module - EU 3139 188 61481 Item number	TOL%	Vendor Company	Vendor Part number
1		PCB L04 NTERFACE MODULE Rev1.0					ALTA	90300-00128-10
2	242202511243	CON BM V 9P M 2.50 EH B	1259	1259	1259		JST00	B9B-EH-A
3	242202511244	CON BM V 7P M 2.50 EH B	1213	1213	1213		JST00	B7B-EH-A
4	242202512479	CON BM V 4P M 2.50 EH B	0237-NL	0237-NL	0237		JST00	B4B-EH-A
5	242202512484	CON BM V 10P M 2.50 EH B	1212	1212	1212		JST00	B10B-EH-A
6	242202515847	CON BM V 4P M 2.50 EH B BK	1219	1219	1219		JST00	B4B-EH-A-K
7	242202515848	CON BM V 5P M 2.50 EH B BK	1692	1692	1692		JST00	B5B-EH-A-K
8	242202512482	CON BM V 6P M 2.50 EH B	1220	1220	1220		JST00	B6B-EH-A
9	242202515849	CON BM V 6P M 2.50 EH B BK	1227	1227	1227		JST00	B6B-EH-A-K
10	242202512479	CON BM V 4P M 2.50 EH B	1582-NL	1582-NL	1582-NL		JST00	B3B-EH-A
11	242202516382	CON BM V 3P M 2.50 EH B BK	1215-NL	1215	1215-NL		JST00	B3B-EH-A-K
12	242202516386	CON BM V 5P M 2.50 EH B RD	0288-NL	0228	0228		JST00	B5B-EH-A-R
13	242202516407	CON BM V 3P M 2.50 EH B RD	0288	0288-NL	0288-NL		JST00	B3B-EH-A-R
14	242202516914	CON BM H 32P F 52613 R	1800	1800	1800		MOLEX	52613-3227
15	319801042030	TRA SIG SM BC847B COL R	7700 7701 7705 7706 7708 7711 7712-NL 7716 7717-NL 7718-NL	7700 7701 7705 7706 7708 7711 7712-NL 7716 7717 7718	7700 7701 7705 7706 7708 7711 7712-NL 7716 7717 7718		PHILIPS	
16	319802043430	TRA SIG SM BC327B COL R	7719-NL	7719	7719		PHILIPS	
17	319802043530	TRA SIG SM BC337B COL R	7702-NL	7702-NL	7702-NL		PHILIPS	
18	932211929685	IC SM DS1813R-5 DAL0 R	7710-NL	7710	7710		DALLAS	DS1813
19	319801631010	CER1 0603 NP0 50V 100P COL	2711 2712	2711 2712	2711 2712		PHILIPS	
20	319801632290	CER1 0603 NP0 50V 22P COL	2705 2706 2707	2705 2706 2707	2705 2706 2707		PHILIPS	
21	319801731040	CER2 0603 X7R 16V 100N COL	2701-NL 2709 2710 2719 2720	2701 2709 2710 2719 2720	2701 2709 2710 2719 2720		PHILIPS	
22	319801741050	CER2 0603 Y5V 10V 1U COL	2700-NL 2702-NL 2704-NL 2716	2700 2702 2704 2716	2700 2702 2704 2716		PHILIPS	
23	319801815690	FXDIND A 02 56U PM5 COL A	5705-NL	5705	5705		TDK	SPT0203A-560J
24	202001292639	25V ELCAP VR S 100u PM20 A	2703	2703-NL	2703-NL		NICH00	
25	203803511504	ELCAP REA 50V S 6u8 PM20 A	2718-NL	2718	2718		TELO00	
26	319802131010	RST SM 0603 100R PM5 COL	3715 3743 3744 3762	3715 3743 3744 3762	3715 3743 3744 3762		PHILIPS	
27	319802132210	RST SM 0603 220R PM5 COL	3750 3753	3750 3753	3750 3753		PHILIPS	
28	319802131020	RST SM 0603 1K PM5 COL	3732 3741 3749-NL 3759-NL 3703-NL 3704-NL	3732 3741 3749 3759 3703-NL 3704-NL	3732 3741 3749 3759 3703-NL 3704-NL		PHILIPS	
29	319802131030	RST SM 0603 10K PM5 COL	3707 3716 3717 3724 3745 3746 3747-NL 3758-NL 3760-NL 3761-NL	3707 3716 3717 3724 3745 3746 3747 3758 3760 3761	3707 3716 3717 3724 3745 3746 3747 3758 3760 3761		PHILIPS	
30	319802132220	RST SM 0603 2K2 PM5 COL	3725	3725	3725			
31	319802132230	RST SM 0603 22K PM5 COL	3701-NL 3702-NL	3701 3702	3701 3702		PHILIPS	
32	319802134720	RST SM 0603 4K7 PM5 COL	3700-NL 3721 3722 3729	3700 3721 3722 3729	3700 3721 3722 3729		PHILIPS	
33	319802133330	RST SM 0603 33K PM5 COL	3755	3755	3755		PHILIPS	
34	319802134730	RST SM 0603 47K PM5 COL	3705-NL 3706-NL 3708 3710 3733 3734	3705 3706 3708 3710 3733 3734	3705 3706 3708 3710 3733 3734		PHILIPS	
35	319802131540	RST SM 0603 150K PM5 COL	3748-NL	3748	3748		PHILIPS	
36	319802136820	RST SM 0603 6K8 PM5 COL	3738-NL	3738	3738		PHILIPS	
37	319802137590	RST SM 0603 75R PM5 COL	3735-NL 3736-NL 3754	3735-NL 3736-NL 3754	3735-NL 3736-NL 3754		PHILIPS	
38	319802131820	RST SM 0603 1K8 PM5 COL	3731-NL	3731-NL	3731-NL		PHILIPS	

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Interface Module: Diversity Table Part 2

J1 INTERFACE MODULE

J1

Partlist Diversity Table

S/N	Component 12NC	Comp. Description	Interface Module - NA 3139 188 61471 Item number	Interface Module - AP 3139 188 61491 Item number	Interface Module - EU 3139 188 61481 Item number		Vendor Company	Vendor Part number
39	319802190030	RST SM 0603 JUMP 0R0 COL	4011-NL 4012-NL 4013-NL 4023-NL	4011-NL 4012 4013 4023	4011 4012-NL 4013 4023		PHILIPS	
40	319801025180	BZX79-C5V1	6703	6703-NL	6703-NL		PHILIPS	
41	934025530115	DIO SIG SM BAS216 PHSE R	6702-NL	6702	6702		PHILIPS	
42	933968000115	DIO REC SM PRLL5817 (PHASE) R	6707-NL 6708-NL 6709-NL	6707 6708 6709	6707 6708 6709		PHILIPS	
43	934038660115	DIO REG SM BZX284-C8V2 PHSE R	6704 6706	6704 6706	6704 6706		PHILIPS	
44	319801636890	CER1 0603 NP0 50V 68P COL	2715	2715	2715		PHILIPS	
45		LV-(one pin ground connection)	1775-NL	1775-NL	1775-NL			
46		RST SM 0603 (reserve)	3756-NL	3756-NL	3756-NL			
47		CER2 0603 (reserve)	2717-NL	2717-NL	2717-NL			
48	R16K00603	RST SM 0603 16K 1%	3751	3751	3751			
49	R2K20603	RST SM 0603 2k2 1%	3720	3720	3720			
50	225458645614	CER2 0603 X7R 50V 220p PM10C	2721	2721	2721		PHILIPS	
51	319802132220	RST SM 0603 2K2 PM5 COL	3752	3752	3752		PHILIPS	
52	202030090564	POLCAPS ECQB 50V 2N2 PM10	2714	2714	2714		PHILIPS	
53	R3K90603	RST SM 0603 3.9K 1%	3719	3719	3719			
54	R9K10603	RST SM 0603 9.1K 1%	3718	3718	3718			
55	933984910668	IC SM LM393D (SO8)	7720	7720	7720		MOTOROLA	LM393DR2
56	319801302210	RST CMP 1/2W A 220R PM20 COL A	3740	3740-NL	3740-NL			
57		WR CU-ETP SNPB5-PL 8MM COL	9001 9002 9003 9004 9005 9007 9008 9009 9010 9011 9012 9013 9014 9015 9016 9017 9020 9021	9001 9002 9003 9004 9005 9007 9008 9009 9010 9011 9012 9013 9014 9015 9016 9017 9020 9021	9001 9002 9003 9004 9005 9007 9008 9009 9010 9011 9012 9013 9014 9015 9016 9017 9020 9021			
58	313911039271	CBLE HR 9P/280/9P HR	1259	1259	1259		Chartered Elec.	313911039271
59	313913103401	CBLE HR 5P/400/5P HR	1692		1692		Chartered Elec.	313913103401
60	313911039031	CBLE HR 07P/220/07P HR 260S BK	1213	1213	1213		Chartered Elec.	313911039031
61	313913103421	CBLE HR 6P/280/3P+280/6P3 BK		1215			Chartered Elec.	313913103421
62	313913103381	CBLE HR 9P4/220/4P BK ITV	1219	1219	1219		Chartered Elec.	313913103381
63	313913103701	CBLE HR 10P/280/7P+340/3P BK	1212	1212	1212		Chartered Elec.	313913103701
64	311913103721	CBLE HR 6P/280/3P+280/3P BK	1227	1227	1227		Chartered Elec.	311913103721
65	313911038921	CBLE HR 6P/220/6P HR		1220	1220		Chartered Elec.	313911038921
66	313512100161	CBLE HR 3P/400/3P RD	0228				Chartered Elec.	313512100161
67	313910717611	CBLE HR 5P/340/5P RD		0228	0228		Chartered Elec.	313910717611

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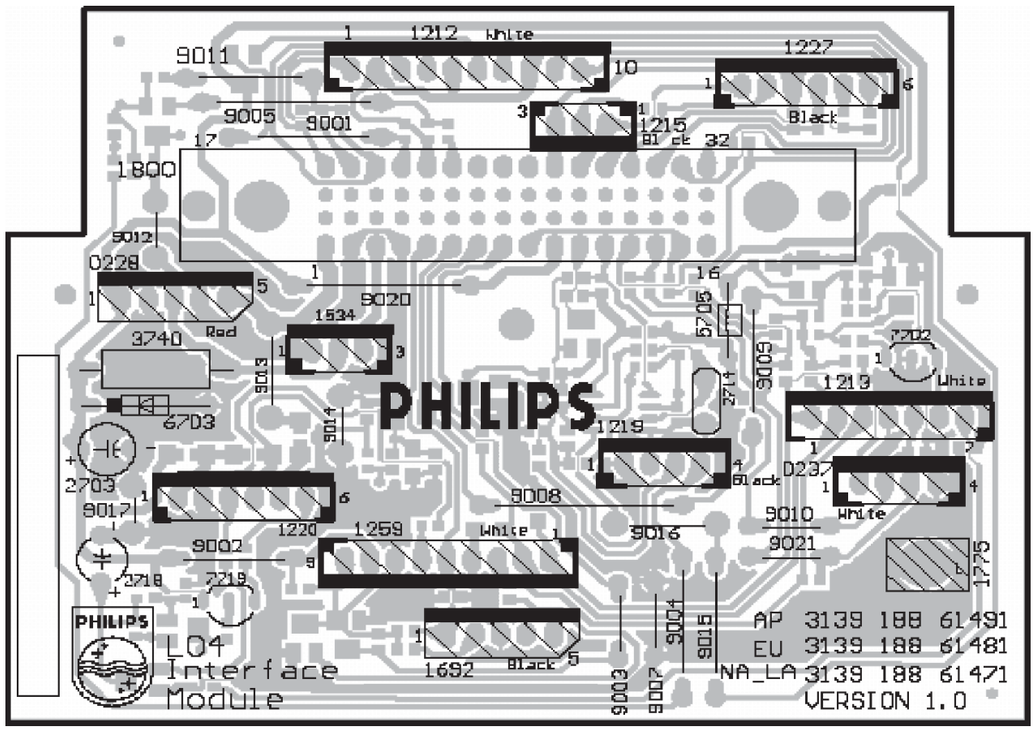
Layout Interface Module (Top Side)



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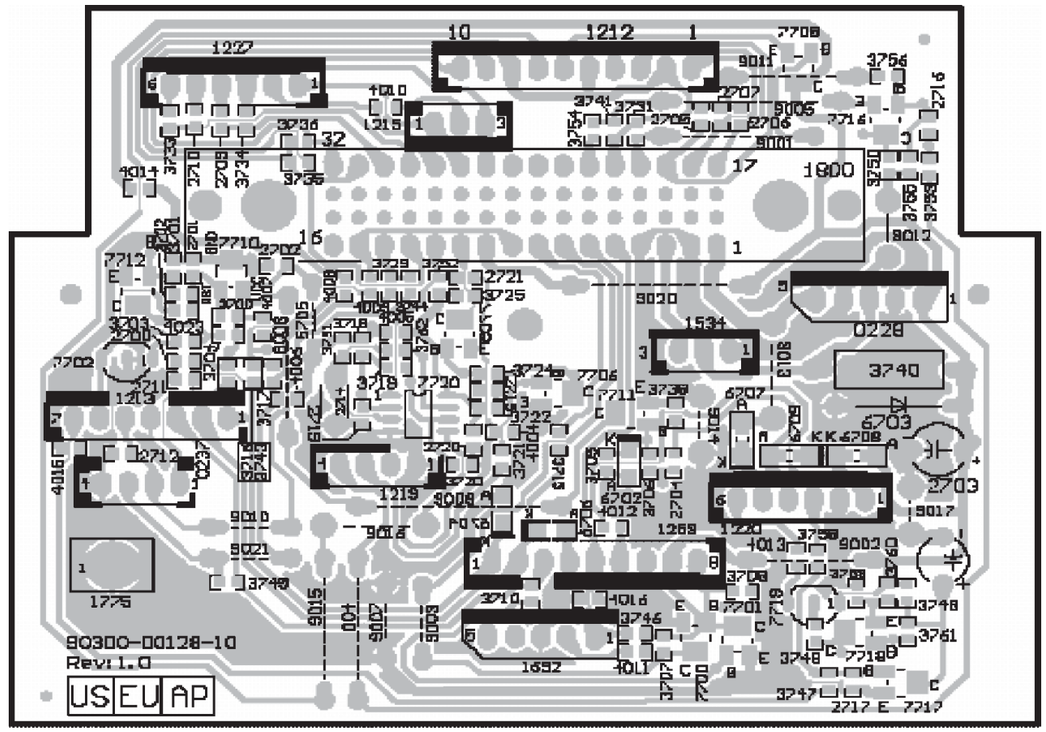
Layout Interface Module (Bottom Side)



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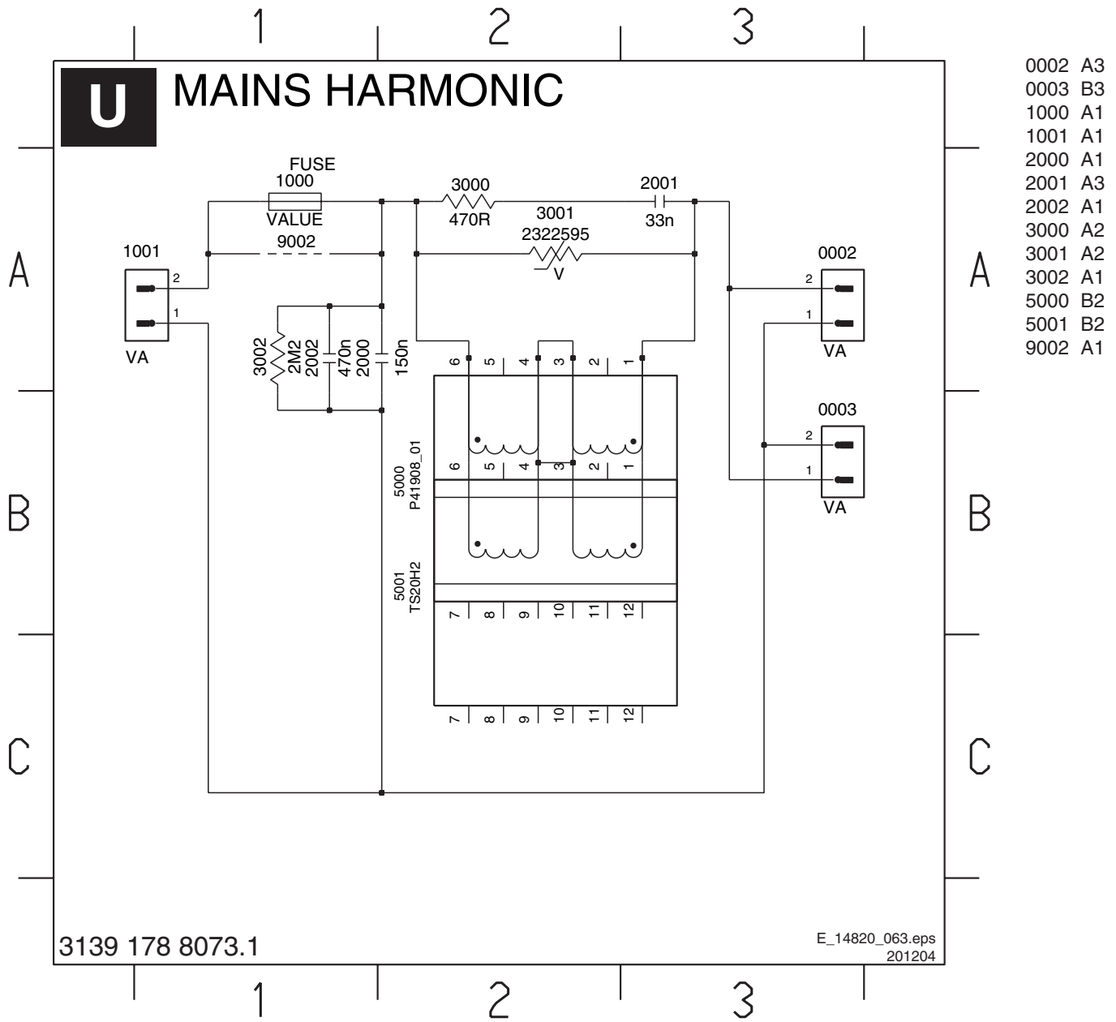
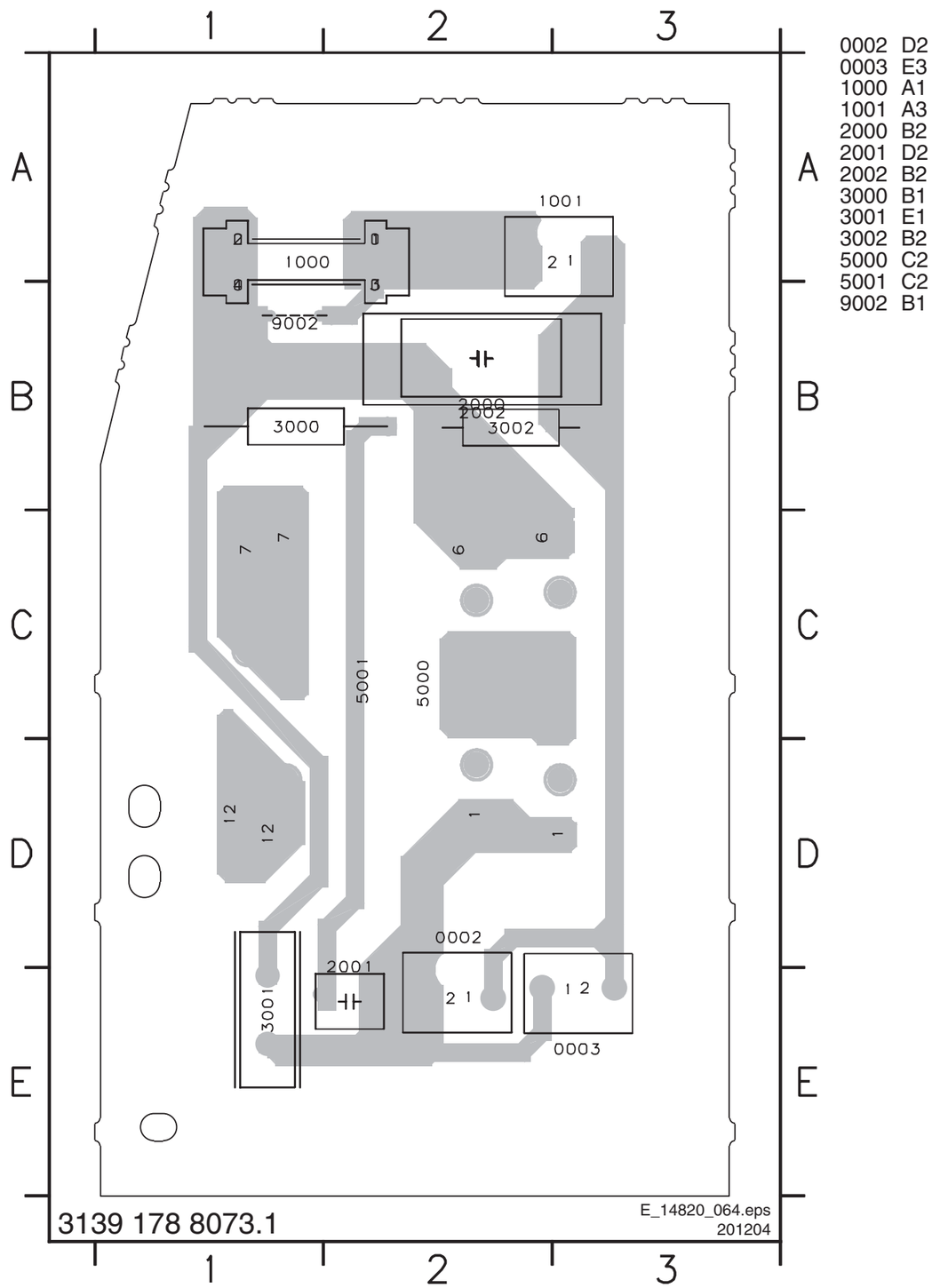
Mains Harmonic Module



Layout Mains Harmonic Module (Top Side)



8. Alignments

Index of this chapter:

8.1 General Alignment Conditions
8.2 Hardware Alignments
8.3 Software Alignments and Settings

Note:

- Figures below can deviate slightly from the actual situation, due to different set executions.
- The Service Default and Alignment Mode (SDAM) is described in chapter 5 “Service Modes, ...”.
- Menu navigation is done with the CURSOR UP, DOWN, LEFT, or RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:

- AC voltage and frequency: 120 V_ac / 60 Hz or 240 V_ac / 50 Hz (region dependent).
- Connect the set to the AC power (a.k.a. Mains voltage) via an isolation transformer with a low internal resistance.
- Allow the set to warm up for approximately 20 minutes.
- Measure the voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply). Never use the cooling fins / plates as ground.
- Test probe: Ri > 10 Mohm; Ci < 2.5 pF.
- Use an isolated trimmer / screwdriver to perform the alignments.

8.2 Hardware Alignments

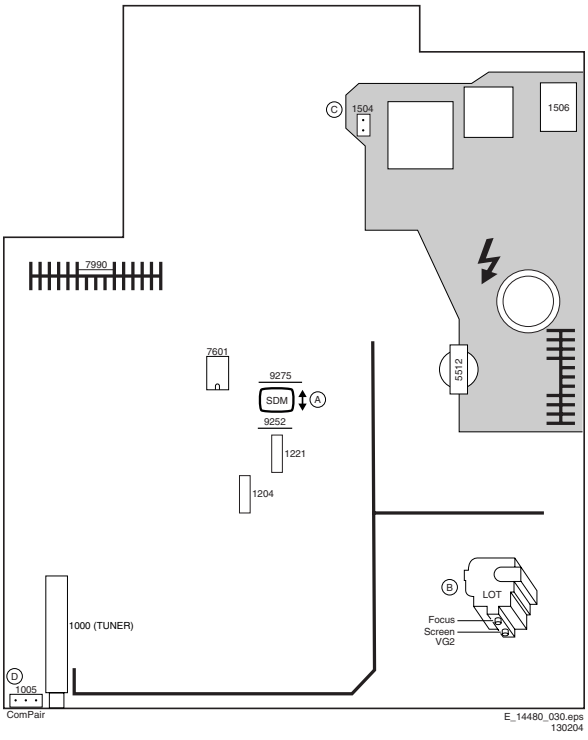


Figure 8-1 Top view family board

8.2.1 Vg2 Adjustment

1. Activate the SDAM.
2. Go to the WHITE TONE sub menu.
3. Set the values of NORMAL RED, GREEN and BLUE to “32”.
4. Go, via the MENU key, to the normal user menu and set
5. SATURATION/COLOR to “0”.
6. CONTRAST to “0”.
7. BRIGHTNESS to minimum (OSD just visible).
8. Return to the SAM via the MENU key.
9. Connect the RF output of a pattern generator to the antenna input. Test pattern is a 'black' picture (blank screen on CRT without any OSD info) with a signal strength of 1 V_pp.
10. Set the channel of the oscilloscope to 50 V/div and the time base to 0.2 ms (external triggering on the vertical pulse). Ground the scope at the CRT panel and connect a 10:1 probe to one of the cathodes of the picture tube socket (see diagram B).
11. Measure the cut off pulse during first full line after the frame blanking (see figure “V_cutoff waveform”). You will see two pulses, one being the “cut off” pulse and the other being the “white drive” pulse. Choose the one with the lowest value; this is the “cut off” pulse.
12. Select the cathode with the highest V_dc value for the alignment. Adjust the V_cutoff of this gun with the SCREEN potentiometer (see figure “Top view family board”) on the LOT to 160 V_dc, except for the 25/28BLD picture tube (Black Line Display, for EU only); this tube must be aligned to 140 V_dc.
13. Restore BRIGHTNESS and CONTRAST to normal (= 31).

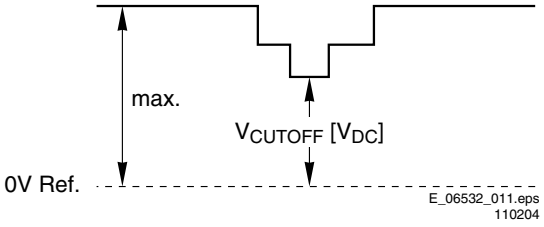


Figure 8-2 V_cutoff waveform

8.2.2 Focusing

1. Tune the set to a circle or crosshatch test pattern (use an external video pattern generator).
2. Choose picture mode NATURAL (or MOVIES) with the SMART PICTURE button on the remote control transmitter.
3. Adjust the FOCUS potentiometer (see figure “Top view family board”) until the vertical lines at 2/3 from east and west, at the height of the centerline, are of minimum width without visible haze.

8.3 Software Alignments and Settings

Enter the Service Default Alignment Mode (see chapter 5).
The SDAM menu will now appear on the screen.
Select one of the following alignments:

1. OPTIONS
2. DEFLECTION
3. TUNER
4. WHITE TONE
5. GEOMETRY

8.3.1 Options

Table 8-1 Option Menu

LLLL AAAABC X.Y S	
ERR XX XX XX XX XX	
OP XXX XXX XXX XXX XXX XXX XXX	
OB0	XXX
OB1	XXX
OB2	XXX
OB3	XXX
OB4	XXX
OB5	XXX
OB6	XXX
LOAD DEFAULT	>
WATCHDOG	ON / OFF
PROTECTION	ON / OFF
SOUND	NONE / 3415 / 3465
DEFAULT SOUND	WEST-EU/ UK / EAST-EU / FRANCE
QSS	ON / OFF
SPI I2C	ON/OFF
CLOCK	LED / NONE / OSD
BUZZER	EXT / NONE / INT
EW	ON / OFF
COMB FILTER	ON / OFF
SCAVEM	ON / OFF
SOFT CLIPPER	ON / OFF
WIDE SCREEN	ON / OFF
ROTATION	ON / OFF
TUNER	NONE / APLS / PHILIPS
US REGION CODE	ON / OFF
WSL	NONE / 4136 / 34836
ACTIVE-OFF LED	ON / OFF
RGB	AV / ALWAYS
AV1	ON / OFF
AV2	ON / OFF
AV3	ON / OFF
AV2YC	ON / OFF
AV3YC	ON / OFF
NO IDENT STANDBY	ON / OFF

Options are used to control the presence / absence of certain features and hardware.

How to Change an Option Byte

An Option Byte represents a number of different options. Changing these bytes directly makes it possible to set all options very fast. All options are controlled via seven option bytes. Select the option byte (OB1.. OB7) with the MENU UP/ DOWN keys, and enter the new value.

Leaving the OPTION submenu and switching the set off with the standby button on the remote saves the changes in the Option Byte settings. Some changes will only take effect after the set has been switched OFF and ON with the AC power switch (cold start).

How to Calculate the Value of an Option Byte

Calculate an Option Byte value (OB1 .. OB7) in the following way:

1. Check the status of the single option bits (OP): are they enabled (1) or disabled (0).
2. When an option bit is enabled (1) it represents a certain value (see first column 'value between brackets' in first table below). When an option bit is disabled, its value is 0.
3. The total value of an Option Byte is formed by the sum of its eight option bits. See second table below for the correct Option Bytes per typenumber.

Table 8-2 Option Bytes

Bit(value)	OB1	OB2	OB3	OB4	OB5	OB6	OB7
0 (1)	OP10	OP20	OP30	OP40	OP50	OP60	OP70
1 (2)	OP11	OP21	OP31	OP41	OP51	OP61	OP71
2 (4)	OP12	OP22	OP32	OP42	OP52	OP62	OP72
3 (8)	OP13	OP23	OP33	OP43	OP53	OP63	OP73
4 (16)	OP14	OP24	OP34	OP44	OP54	OP64	OP74
5 (32)	OP15	OP25	OP35	OP45	OP55	OP65	OP75
6 (64)	OP16	OP26	OP36	OP46	OP56	OP66	OP76
7 (128)	OP17	OP27	OP37	OP47	OP57	OP67	OP77
Total:	Sum	Sum	Sum	Sum	Sum	Sum	Sum

Option Bit Assignment
Following are the option bit assignments for all L01 ITV software clusters.

Table 8-3

Options	Bit	Description	Value
Byte 0	7	Not Used	
(TV System)	6		
	5	Default sound	1 = BG (or West EU), 2 =I (or UK), 3 = DK (or East EU), 4 = M, 5 = LL (or France)
	4		
	3		
	2	Sound Board	0 = Mono (no sound board), 1 = Mulit Stereo, 2 = BTSC Stereo, 3 = AV stereo
	1		
	0		
Byte 1	7	Not Used	
(Pin Usage)	6	WideScreen	1 = 16:9 set
	5	Rotation	1= Rotation On
	4	QSS	1 = UOC and chasis support QSS
	3	Uir Msg	1 = Uir Msg supported
	2	SPI I2C	1 = I2C at 32-pin card interface
	1	Not Used	
	0	Not Used	
Byte 2	7	SCAVEM	1 = SCAVEM is supported
(Devices)	6	Comb Filter	1 = Comb filter is available
	5	EW	1 = Chasis supports East-West alignment
	4	Not Used	
	3	Radio	1 = Tuner has FM radio feature and TV chasis support FM radio
	2	LNA	1 = Tuner has LNA feature
	1	Tuner	0 = None (no tuner), 1 = Philips (model), 2 = Alps (model)
	0		
Byte 3	7	Not Used	
(Devices)	6	Soft Clipper	1 = Soft Clipper on
	5	Not Used	
	4	US Region Code	
	3	SmartPort	1 = Chasis supports SmartPort (SPI or I2C)
	2	Active-Off LED	1 = LED ON
	1	WSL	0 = None (no used), 1 =4136 (IR receiver model), 2 =34836 (IR receiver model)
	0		
Byte 4	7	Not Used	
(AV, Tuning)	6	AV3YC	1 = AV3YC available
	5	CVI	1 = CVI available
	4	AV2YC	1 = AV available
	3	AV3	1 = AV available
	2	AV2	1 = AV available
	1	AV1	1 = AV available
	0	RGB	0 = RGB input always allowed, 1 = RGB insertion allowed only when current input source is AV1
Byte 5	7	Not used	
(Feature)	6	Protection	1 = Protection (TV go to standby). 0 = No protection but errors are still logged.
	5	WatchDog	1 = Watchdog feature is enabled
	4	No Ident Standby	1 = TV goes standby after 10mins of no RF signal.
	3	Buzzer Type	0 = None (no buzzer), 1 = Internal (generated by TV microp), 2 = External (generated by I2C device)
	2		
	1	Clock Type	0 = None (no clock), 1 = OSD, 2 = LED Module
	0		
Byte 6	7	Not Used	
(Power)	6	Not Used	
	5	Not Used	
	4	Not Used	
	3	Not Used	
	2	Not Used	
	1	Card Power	0 = No card reset, 1 = Card reset at once, 2 = Card reset upon HW reset always,
	0		3 = Card reset upon HW, but only when POR monitored

8.3.2 Deflection

The Deflection Sub menu contains the following items:
- AKB ON to enable, OFF to disable the 'black current loop' (AKB = Auto Kine Bias).
- Brightness (set Brightness)
- Contrast (set Contrast)

"See VG2 alignment"

8.3.3 Tuner

The Tuner Sub menu contains the following items:
Note: Described alignments are only necessary when the NVM (item 7602) is replaced.

IF PLL
Phase Locked Loop Used for FST tuning systems.
Adjust the IFPLL value (default value is 30) with the LEFT/ RIGHT cursor keys.

AGC (AGC take over point)
Set the external pattern generator to a colour bar video signal and connect the RF output to aerial input. Set amplitude to 10 mV and set frequency to 475.25 MHz (PAL).
Connect a DC multimeter to pin 1 of the tuner (item 1000 on the main panel).
1. Activate the SDAM.
2. Go to the TUNER sub menu.
3. Select AGC with the UP/DOWN cursor keys.
4. Adjust the AGC-value (default value is 28) with the LEFT/ RIGHT cursor keys until the voltage at pin 1 of the tuner lies between 3.8 and 2.3 V.
5. Switch the set to STANDBY.

SL (Slicing level)
Slicing level for vertical sync
This adjustment is always set to 0 (for NTSC system only).

CFA0
Comb Filter forced mode.
This adjustment is always set to OFF.

CL (cathode drive level)
Adjust the CL value (default value is 4) with the LEFT/RIGHT cursor keys.

YD
Y-delay adjustment.
This is a fixed value, always set to 2.

8.3.4 White Tone

In the WHITE TONE sub menu, the values of the black cut off level can be adjusted. Normally, no alignment is needed for the WHITE TONE. You can use the given default values.
The colour temperature mode (NORMAL, COOL and WARM) and the colour (RED, GREEN, and BLUE) can be selected with the UP/DOWN RIGHT/LEFT cursor keys. The value can be changed with the LEFT/RIGHT cursor keys. First, select the values for the NORMAL colour temperature. Then select the values for the DELTA COOL and DELTA WARM mode. After alignment, switch the set to standby, in order to store the alignments.

8.3.5 Geometry

The geometry alignments menu contains several items to align the set, in order to obtain correct picture geometry.

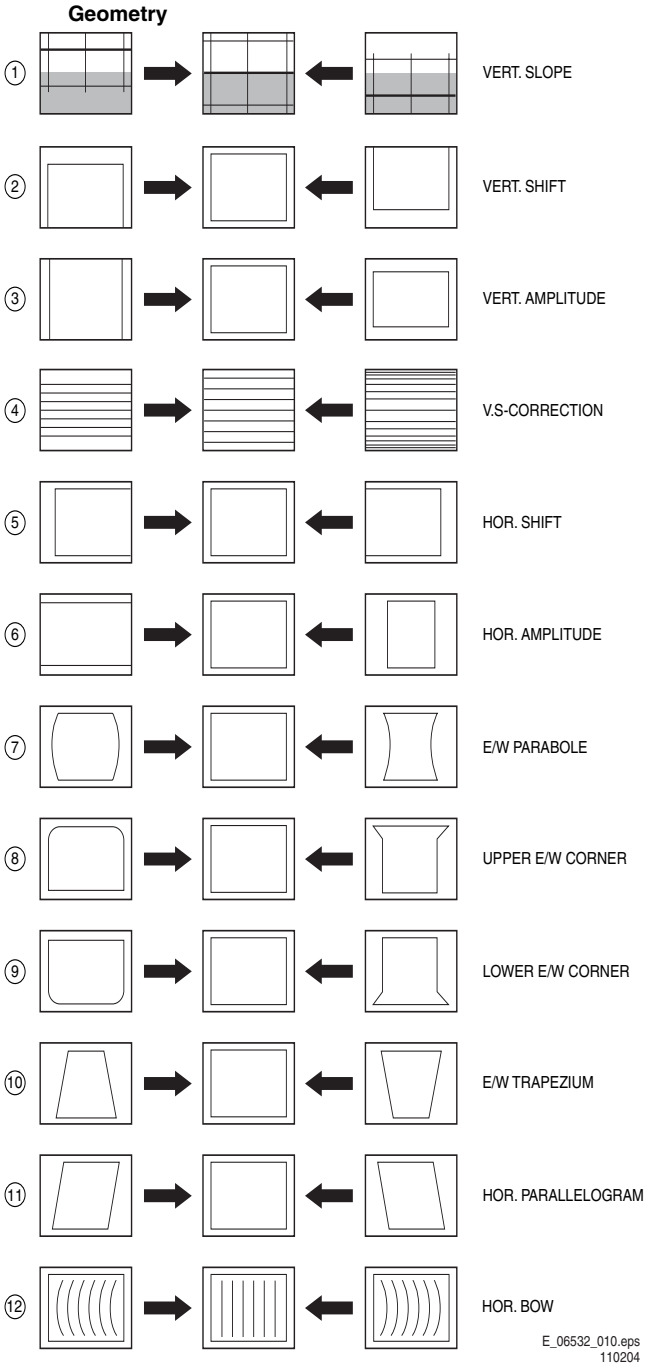


Figure 8-3

Connect an external video pattern generator to the aerial input of the TV-set and input a crosshatch test pattern. Set the generator amplitude to at least 1 mV and set frequency to 61.25 MHz (NTSC).
1. Activate the SDAM menu (see chapter 5).
2. Go to the GEOMETRY sub menu.

Now you can perform the following alignments:
- Horizontal Parallelogram (HP) Align straight vertical lines in the top and the bottom; vertical rotation around the centre.
- Horizontal Bow (HB) Align straight horizontal lines in the top and the bottom; horizontal rotation around the centre.
- Horizontal Shift (HS) Align the horizontal centre of the picture to the horizontal centre of the CRT.
- Vertical slope (VS) Align the vertical centre of the picture to the vertical centre of the CRT. This is the first of the vertical alignments to perform. For an easy alignment, set SBL to ON.
- Vertical Amplitude (VA) Align the vertical amplitude so that the complete test pattern is visible.

- Vertical S-Correction (SC) Align the vertical linearity, meaning that vertical interval of a grid pattern must be equal over the entire screen height.
- Vertical Shift (VSH) Align the vertical centring so that the test pattern is located vertically in the middle. Repeat the 'vertical amplitude' alignment if necessary.
- Service blanking (SBL) Switch the blanking of the lower half of the screen ON or OFF (to be used in combination with the vertical slope alignment).

For EW versions :

- Set Horizontal Parallelogram HP to prevent the picture from slanting to one side.
- Set Horizontal Bow HB to prevent the top and bottom of picture from bending to the sides.
- Select Vertical Zoom VX to align the vertical linearity over the entire screen height (for 16 : 9 applications only).
- Set Trapezium Correction TC to align the lines at the vertical sides.
- Select East-West Width EW and align the picture width until the side castellations disappear.
- Select East-West Parabola / width PW and align the vertical sides until the sides are straightened.
- Select Upper Corner Parabola UCP to straighten the top of the vertical lines at the sides.
- Select Lower Corner Parabola LCP to straighten the bottom of the vertical lines at the sides.
- Repeat the last 5 steps if necessary.

9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets

Index of this chapter:

9.1 Introduction
9.2 Power Supply
9.3 Deflection
9.4 Control
9.5 Tuner and IF
9.6 Source Select
9.7 Video Processing
9.8 Audio Processing
9.9 Audio Amplifier
9.10 Abbreviation List
9.11 IC Data Sheets

Notes:

- Only **new** circuits compared to the L01.1 chassis are described in this chapter. For the other circuit descriptions, see the manual of the L01.1 chassis.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in sections “Block Diagrams, ...”, and/or “Electrical Diagrams”. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The "L04" chassis is a global TV chassis for the model year 2004 and is used for TV sets with large screen sizes (from 21 to 36 inch), in Super Flat and Real Flat executions (both in 4:3 and 16:9 variants).
There are three types of CRT namely the 100 degrees, 110 degrees and Wide Screen CRT.

- The 100 deg. 4:3 CRT is raster-correction-free and does not need East/West Correction (except when used in AP regions), therefore the corrections needed are Horizontal Shift, Vertical Slope, Vertical Amplitude, Vertical S-Correction, Vertical Shift, and Vertical Zoom for geometry corrections.
- The 110 deg. 4:3 CRT comes with East/West Correction. In addition to the parameter mentioned above, it also needs the Horizontal Parallelogram, Horizontal Bow, Horizontal Shift, East/West Width, East/West Parabola, East/West Upper and Lower Corners, and East/West Trapezium correction.
- The Wide Screen TV sets have all the correction of the 110 deg. 4:3 CRTs and also have additional picture format like the 4:3 format, 16:9, 14:9, 16:9 zoom, subtitle zoom, and the Super-Wide picture format.

In comparison to its predecessor (the L01.1), this chassis is has the following (new) features:

- Audio: The sound processor is part of the UOC processor (called “Hercules”).
- Video: Enhanced video features, video drivers, and Active Control.
- Control: Comparable to L01.1 (e.g. Dual clock, I/O mapping, I/O switching).
- Power Supply: Adapted to supply the Hercules IC, and to enable 0.5 W Standby power dissipation. Also provisions are made for future extensions like DVD and iDTV.

The standard architecture consists of a Main panel (called "family board"), a Picture Tube panel, a Side I/O panel, and a Top Control panel. The Main panel consists primarily of conventional components with some surface mounted devices in the audio and video processing part.
The functions for video/audio processing, microprocessor (P), and CC/Teletext (TXT) decoder are all combined in one IC (TDA1200x, item 7200), the so-called third generation Ultimate One Chip (UOC-III) or “Hercules”. This chip is mounted on the “solder” side of the main panel, and has the following features:

- Control, small signal, mono/stereo, and extensive Audio/ Video switching in one IC.
- Upgrade with digital sound & video processing.
- Alignment free IF, including SECAM-L/L1 and AM.
- FM sound 4.5/5.5/6.0/6.5, no traps/bandpass filters.
- Full multi-standard color decoder.
- One Xtal reference for all functions (microprocessor, RCP, TXT/CC, RDS, color decoder, and stereo sound processor).

The tuning system features 181 channels with on-screen display. The main tuning system uses a tuner, a microcomputer, and a memory IC mounted on the main panel. The microcomputer communicates with the memory IC, the customer keyboard, remote receiver, tuner, signal processor IC and the audio output IC via the I2C bus. The memory IC retains the settings for favorite stations, customer-preferred settings, and service / factory data.
The on-screen graphics and closed caption decoding are done within the microprocessor where they are added to the main signal.

The chassis uses a Switching Mode Power Supply (SMPS) for the main voltage source. The chassis has a 'hot' ground reference on the primary side and a cold ground reference on the secondary side of the power supply and the rest of the chassis.

9.2 Power Supply

9.2.1 Block Diagram

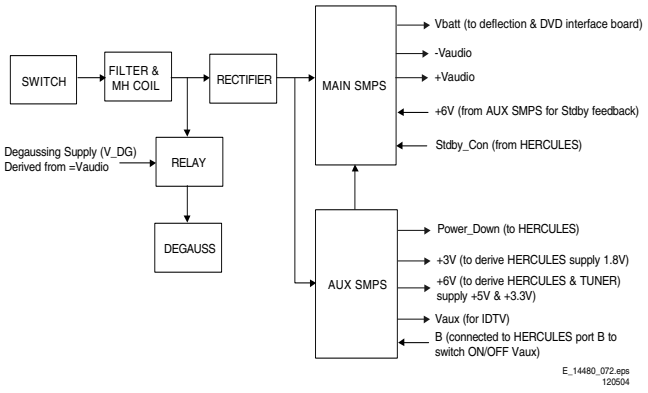


Figure 9-1 Block diagram power supply

Stdby_con signal
The Hercules generates this signal. This line is logic “low” (0 V) under normal operation and in semi-Standby of the TV, and is “high” (3.3 V) during Standby.

Power_down signal
The AUX SMPS generates this signal. It is logic “high” (3 .3 V) under normal operation of the TV and goes “low” (0 V) when the AC power (or Mains) input voltage supply goes below 70 V_ac.

B (Hercules port)
This port is used to switch the AUX SMPS output V_aux “On/ Off”. This is required for DVD and iDTV (for future extensions).

9.2.2 Timing Diagrams

Power ON - To Standby - Out of Standby - Power OFF

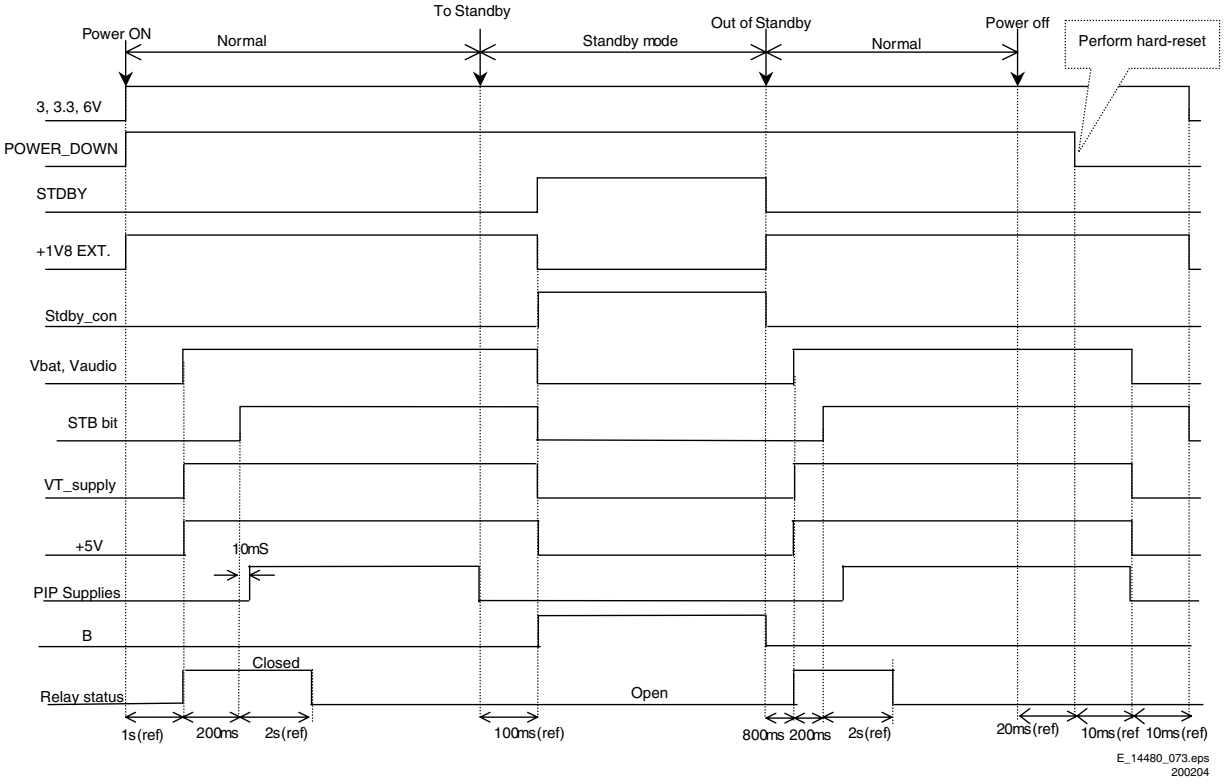


Figure 9-2 Timing diagram Standby

Power ON - To Semi Standby - Out of Semi Standby - Power OFF

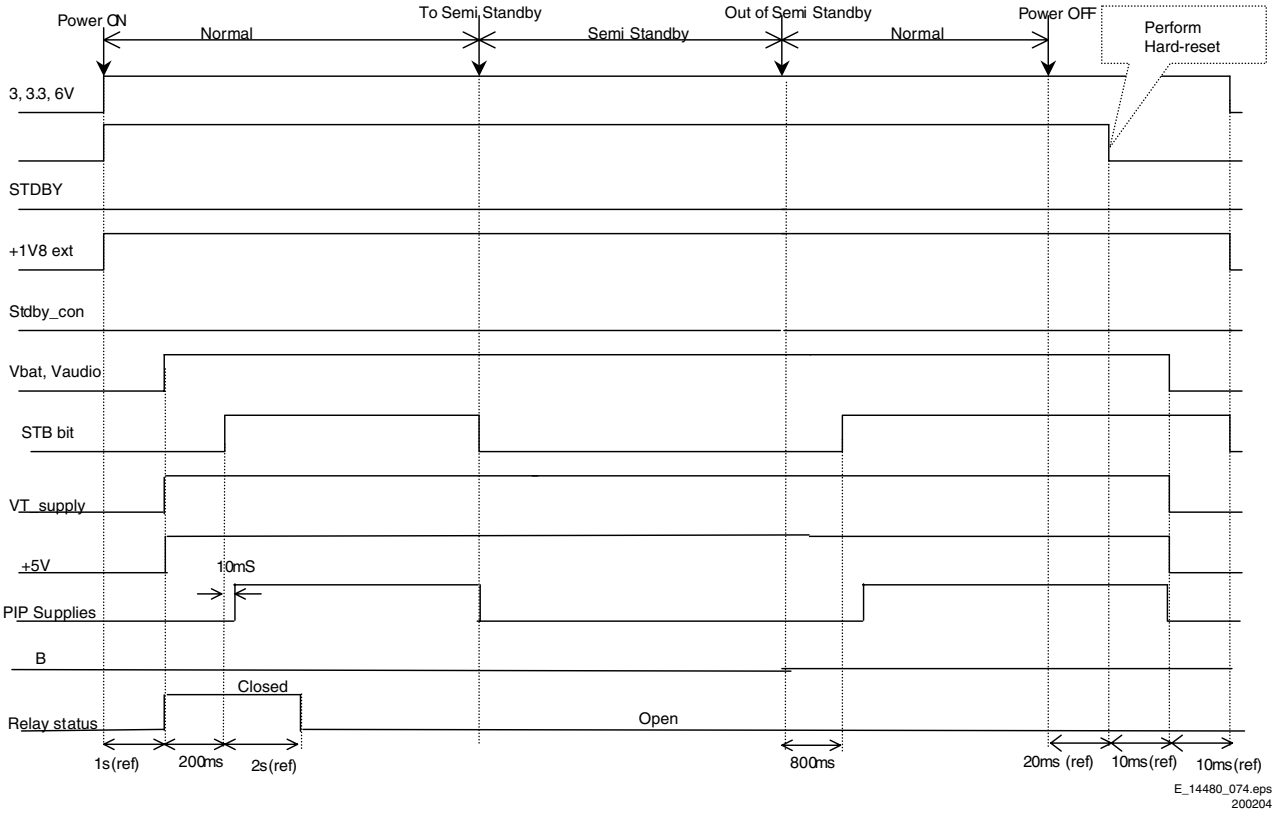


Figure 9-3 Timing diagram Semi Standby

9.2.3 Startup Sequence

When the set is connected to the AC power, the rectified line voltage (via winding 4-5 of L5531 connected to pin 14 of IC7531) will start the internal voltage source to charge the V_cc capacitor (C2532). The IC starts to switch as soon as the V_cc reaches the V_cc start level of 9.5 V. This supply is automatically taken over by winding 1-2, as soon as the V_cc is high enough, and the internal supply source will stop (for high efficiency switching).

Table 9-1 Pinning overview TEA1523

Pin	Symbol	Description
2	Gnd	This pin is Ground of the IC.
3	V_cc	This pin is connected to the supply voltage. An internal current charges the V_cc capacitor (2532), and the start-up sequence is initiated when this voltage reaches a level of 9.5 V. Note: The output power is disabled when the voltage gets below 9 V (UVLO). Operating range is between 0 to 40 V.
5	RC	Frequency setting
6	REG	This pin is connected to the feedback loop. The pin contains two functions: 1) Between 1 to 1.425 V it controls the "on" time. 2) Above the threshold of 3.5 V, it is possible to initiate "burst mode" standby.
11	Demag	This pin is connected to the V_cc winding of 5531. It has three functions: 1) During Magnetisation, the input voltage is sensed to compensate OCP level for OPP. 2) During demagnetisation, the output voltage is sensed for OVP and 3) A comparator is used to prevent continuous conduction when output is overloaded.
12	Sense	This pin contains three different functions.: 1) Dectection of soft start, protection levels of 2) OCP, and 3) SWP.
14	Drain	This pin is connected to the drain of the switch or center tap of the transformer. It contains three functions: 1) M-level (mains-dependent operation-enabling level), 2) Supply for start-up current, and 3) Valley detection.

As C2532 of IC7531 is charged, it will also start to charge the V_cc capacitor (C2511) of IC7511. Via resistor R3519 and C2511, the TEA1506 starts to switch as soon as the V_cc voltage reaches the V_cc start level of is about 11 V. The V_cc voltage is automatically taken over by the main transformer L5512 (winding 2-3) when the V_cc is high enough (when this voltage is even higher than the voltage on C2511, there is no current flow from C2532 to C2511 due to diode D6512).

Table 9-2 Pinning overview TEA1506

Pin	Symbol	Description
2	Vcc	This pin is connected to the supply voltage. When this voltage is high (Vcc_start level, about 11 V), the IC will start switching. When the voltage is lower than Vcc_uvlo (about 8.7 V), the IC will stop switching.Note: This pin is not self supplied by internal source like in TEA1507
3	Gnd	This pin is Ground of the IC.
6	Ctrl	This pin is connected to the feedback loop. The pin will control the "on" time between 1 V to 1.5 V.
7	Demag	This pin is connected to the Vcc winding of 5512. It contains three functions: 1) During magnetisation, the input voltage is sensed to compensate OCP level for OPP, 2) During demagnetisation, the output voltage is sensed for OVP and 3) a comparator is used to prevent continuous conduction when the output is overloaded.
9	Sense	This pin contains three different functions: 1) dectection of soft start, protection levels of 2) OCP, and 3) SWP.
11	Driver	This pin will drive the (MOSFET) switch.
12	HVS	This is High Volt Spacer (n.a.)
14	Drain	Connected to the Drain of the external MOSFET switch, this is the input for valley sensing and initial internal supply.

9.2.4 Standby Mode

In this mode, IC7511 (TEA1506) will be totally disabled. So there is no voltage on the main transformer output. But IC7531 (TEA1523) will still work and will provide the necessary output voltages (6V -> 5V, 3.3V, 3V -> 1.8V) to the Hercules (IC7200).

Table 9-3 PSU voltage overview

Voltage	Normal operation	Stdby mode
V_batt	130 - 143 V	0 V
V_audio	+/- 15.5 V	0 V
+6V	6 V	6 V
+3V	3 V	3 V
Stdby_con	0 V	3.3 V

9.3 Deflection

9.3.1 Synchronization

Before the Hercules (IC7200) can generate horizontal drive pulses, the +3.3V supply voltages must be present. After the start up command of the microprocessor (via I2C), the Hercules outputs the horizontal pulses. These horizontal pulses begin “initially” with double line frequency and then change “gradually” to line frequency in order to limit the current in the line stage (slow-start).

The VDRA and VDRB signals are the balanced output currents (sawtooth shaped) of the frame oscillator (pins 106 and 107 of the Hercules). These output signals are balanced, so they are less sensitive to disturbances.

There is a current source inside the UOC at pin 102. This pumps energy in the capacitor connected to this pin producing a pure saw tooth. The vertical drive signals and the E/W correction signal are derived.

Pin 108 is the East-West drive (or AVL), and it is a single ended current output. The correction for “horizontal width for changed EHT” from this pin is available by setting the HCO bit to “1”.

The Phase-2 Compensation available at pin 113 gives frame correction for high beam currents. The phase compensation signal is used to correct the phase of the picture from the horizontal drive signal.

Pin 63 is the SANDCASTLE output (contains all sync info) and also HORIZONTAL FLYBACK (HFB) input.
Pin 97 is the EHT tracking/over-voltage protection pin. The HCO bit can switch on the tracking on EW. If the voltage at pin 97 exceeds 3.9 V, the over-voltage protection will be activated and the horizontal drive is switched “off” via a slow stop.

9.3.2 Horizontal Deflection

There are several executions (depending on the CRT):

- **Sets with no East-West correction.** The principle of the horizontal deflection is based on the quasi-diode modulation circuit. This horizontal deflection circuit supplies the deflection current and auxiliary voltages from the LOT.
- **Sets with East-West correction.** The principle of the horizontal deflection is based on a diode modulator with east-west correction. This horizontal deflection circuit supplies the deflection current and auxiliary voltages from the LOT.
- **Sets with dynamic East-West correction.** The principle of the horizontal deflection is based on a diode modulator with dynamic east-west correction for picture tubes with inner pincushion. This horizontal deflection circuit supplies the deflection current and auxiliary voltages from the LOT.

Basic Principle
During a scan period, either the Line Transistor or diode(s) conduct to ensure a constant voltage over the deflection coil (that results in a linear current). During the flyback period, the Line Transistor stops conducting, and the flyback capacitor(s) together with the inductance of the deflection coil creates oscillation.

First Part of Scan
Pin 62 of the UOC delivers the horizontal drive signal for the Line Output stage. This signal is a square pulse of line frequency. L5402 is the flyback drive transformer. This transformer de-couples the line output stage from the UOC. It has a direct polarization. The flyback drive circuit works with the start-up supply taken from +6V of the Aux supply (and subsequently taking from VlotAux+9V). When the H-drive is high, TS7404 conducts, and transformer L5402 starts to store energy. The base of the line transistor TS7405 is low and therefore blocks. The current in the deflection coil returns from diode D6404.

Second Part of Scan
When the H-drive is low, TS7404 does not conduct, and the energy that is stored in the transformer will transfer to the secondary, making the base of the Line Transistor high. Then the Line Transistor starts to conduct. The current in the deflection coil returns from the transistor in another direction.

Flyback
At the moment the H-drive becomes high, the base of the Line Transistor becomes low. Both the Line Transistor and the Flyback Diode will block. There is an oscillation between the flyback capacitor C2412 and the deflection coil. Because of the inductance of the LOT, the Line Transistor cannot stop conducting immediately. After the Line Transistor is out of conduction, the flyback pulse is created. The flyback capacitor charges until the current in the deflection coil reduce to zero. Then it discharges through the deflection coil and the deflection current increases from the other direction. The flyback diode conducts and is back to the first part of the scan.

Linearity Correction
Because the deflection coil has a certain resistance, a picture without any linearity issues cannot be expected. L5401 is the linearity coil to compensate for this resistance. It is a coil with a pre-magnetized core. This correction is called linearity correction.

Horizontal S-Correction
Because the electronic beam needs to travel a longer distance to both sides of the screen than the center, the middle of the screen would become narrower than both sides. To prevent this, a parabolic voltage is applied across the deflection coil during scan. To create this parabolic voltage, a capacitor called S-cap (C2417/C2418) is used as a voltage source during scan. The sawtooth current of the deflection through this capacitor creates the required parabolic voltage. This correction is called S-Correction.

Mannheim-Circuit
When the EHT is heavily loaded with a bright line, the flyback time can be increased a bit in this situation. As a result, the scan delays a bit causing a DC-shift to the right in the next line, which would create a small spike on the S-cap. This spike oscillates with the inductance of the deflection coil and the primary of LOT. The result is visible in vertical lines under horizontal white line. This is called the Mannheim-effect.

To prevent this from happening, a circuit called Mannheim-circuit is added. This consists of C2415, R3404, R3417 and D6406. During the scan, C2415 is charged via R3417. During the flyback, the S-correction parabola across the S-Cap C2417/C2418 is in its most negative, and D6406 conducts. Thus, C2415 is switched in parallel to C2417/C2418 during flyback. As C2415 is much larger than C2417/C2418, the voltage across C2415 reduces the Mannheim-effect oscillation.

Class D East-West Driver
To reduce the power loss of the normal used linear East-West amplifier, a class-D East-West circuit is used. To achieve this, the East-West parabola waveform EW_DRIVE from the Hercules (frame frequency) is sampled with a saw tooth (line frequency) taken from the line aux output. Then a series of width-modulated pulses is formed via two inverted phase amplifiers, filtered by an inductor, which then directly drive the diode modulated line circuit.

East-West Correction
To achieve a good geometry, **dynamic** S-correction is needed. The design is such that the tube/yoke needs East-West correction. Besides that, an inner pincushion is present after East-West correction. The line deflection is modulated with a parabolic voltage (frame frequency). In this way it is not so much at top and bottom, and much more in the middle.

Upon entering the picture geometry menu in the SAM mode, the following corrections will be displayed.
- EWW: East West Width.
- EWP: East West Parabola.
- UCP: Upper Corner Parabola.
- LCP: Lower Corner Parabola.
- EWT: East West Trapezium.

The East-West drive circuit realizes them all. The settings can be changed by a remote control. All changed data will be stored into the NVM after the geometry alignment.

Panorama
For Wide Screen sets, the S-correction of the picture has to adapt between the different picture modes. In particular, between 16:9 Wide Screen and 4:3 picture modes. This is achieved with the (separate) Panorama circuit (see diagram “G”). A signal (I2SDI1) from the UOC controls the state of TS7463. When in the normal 16:9 Wide Screen mode, the signal is “low” and therefore TS7463 is switched “off”.
When the 4:3 mode is selected, this signal from the UOC is pulled “high”, switching TS7463 “on”. The relay 1463 on the Panorama panel is subsequently turned “on” and, in effect, paralleling capacitor C2475/C2474 to the S-Cap C2469/C2470. This changes the overall effective S-correction. The relay is switched “on” in 4:3 and Superwide picture modes.

9.3.3 Auxiliary Voltages

The horizontal deflection provides various auxiliary voltages derived either directly or indirectly from the secondary pins of the LOT:
- +9V: This supplies the Hercules’s flyback driver.
- +11V: This supplies the frame amplifier.
- -12V: This supplies the frame amplifier.
- 50V: This supplies the frame amplifier.
- Filament: This supplies the heater pins of the picture tube.
- VideoSupply (+200V from primary side of LOT): This supplies the RGB amplifier and Scavem circuit at the CRT panel.

Notes:
- The V_T voltage (to tuner) is drawn from V_batt.
- The EHT voltage is generated by the Line Output Transformer (LOT). The Focus and Vg2 voltages are created with two potentiometers integrated in the transformer.

9.3.4 Beam Current

The beam current is adjusted with R3451 and R3452. The components R3473, R3453 and C2451 determine the EHT_info characteristic. The voltage across C2412 varies when the beam current changes. This EHT_info is used to compensate the picture geometry via pin 97 of the Hercules when the picture changes rapidly, and compensate the phase 2 loop via pin 113 of the Hercules. Also from the EHT_info line, a BCL signal is derived and sent to the Hercules for controlling the picture’s contrast and brightness.

When the picture content becomes brighter, it will introduce:

- Geometry distortion due to the impedance of the LOT causing the EHT to drop.
- Picture blooming due to the picture characteristics

Because of the above mentioned, we will need a circuit for Beam Current Limiter (BCL) and EHT compensation (EHT_info). These two circuits derive the signal from the picture tube current info through LOT pin 10.

BCL

- When the BCL pin voltage goes to 2.8 V, the Hercules will start to limit CONTRAST gain.
- When it reaches 1.7 V, then the BRIGHTNESS gain limit will start to react.
- When BCL pin voltage goes to 0.8 V, the RGB will be blanked.

Components TS7483, R3490, R3491, R3492, and C2483 are for fast beam current limiting (e.g. with a Black-to-White pattern).

Components R3454, D6451, D6450, C2453, R3493, and C2230 are for average beam current limiting. C2453 and R3493 also control the timing where average beam current limiting is more active or less active.

EHT_info

The “PHI2 correction” is to correct the storage time deviation of the Line Output Transistor, which is causing geometry distortion due to brightness change.
Line EHT_info is to correct the geometry distortion due to EHT deviation.
Both of them feedback through the EHTO and PH2LF pin, and correct the geometry through the East-West circuit.

Power Down

The power down connection is for EHT discharge during AC Power “Off” state. In the Hercules, if EHT_info > 3.9 V, it will trigger the X-ray protection circuit via a 2fH soft stop sequence. The Hercules bits OSO (Switch Off in Vertical Over scan) and FBC (Fixed Beam Current Switch Off) will discharge the EHT with 1mA cathode current at over-scan position.
During switch-off, the H_out frequency is doubled immediately and the duty cycle is set to 25% fixed, during 43 ms. The RGB outputs are driven “high” to get a controlled discharge of the picture tube with 1 mA during 38 ms. This will decrease the EHT to about half the nominal value (= safety requirement). When bit OSO is set, the white spot/flash during switch-off will be written in overscan and thus will not be visible on the screen. Careful application must guarantee that the vertical deflection stays operational until the end of the discharge period.

9.3.5 DAF

The Dynamic Astigmatic Focus (DAF) circuit is required by 34RF sets only. It provides vertical DAF and horizontal DAF. Both of the parabola signals are derived through integration by using chassis available signals:

- The vertical parabola is using RC integration (via R3403 and C2401) on the Frame sensing resistor saw tooth (Frame_FB).
- The horizontal parabola is obtained by 2 RC integration (R3409, R3410, C2402, C2403) on the +9V LOT output.

Both of the parabolas are added on the output stage through adder TS7402 and TS7403. The collector of TS7402 emitter-drives TS7401 and is amplified by pull up resistor R3411. D6401 and C2405 provide the rectified supply voltage.

9.3.6 X-ray Protection

The X-ray protection circuit rectifies the filament voltage and uses it to trigger TS7481 when the EHT is too high. TS7481 is biased at “off” condition by D6480, R3482, and R3483 during normal operation. When the EHT goes too high, the voltage across R3482 will tend to increase as well, while the voltage across D6481 is fixed. Up to certain level (triggering point), TS7481 will be “on” and will force the EHT_info > 3.9 V. The chassis will be shut down through a soft stop sequence.

9.3.7 Vertical Deflection

The Frame stage consists fully of discrete components. This has the advantage for better flash behavior than when an IC was used.

The Frame differential drive signal from the Hercules comes from a current source. Resistors R3460 and R3461 convert them into a voltage, and feed them into the differential amplifier TS7455 and TS7456. The output of TS7456 is input to the next amplification stage of TS7452. Finally, TS7451 and TS7453 deliver the Vertical yoke current to the coil and feedback through the sensing resistors R3471 and R3472.
D6458 and TS7454 are used to bias TS7451 and TS7453, to get rid of zero crossovers, which can cause horizontal lines at the screen center.
The negative supply is from -12V and the positive scanning supply is from +12V through D6459. The flyback supply is derived from D6455, D6456 and C2456. This circuit is a voltage doubler, which stores energy in C2456 during the Line flyback period and delivers the energy to C2465 during the Line scanning period. Throughout the Frame period, the charging and discharging of C2456 works alternatively. However, at the first half of the Frame scanning, TS7451 is “on” and consumes all the charge from C2456. When entering 2nd half Frame period, TS7451 is “off”, so C2456 will gradually charge up to the required flyback supply.

C2463, R3464 and D6457 are for boosting the base voltage of TS7451 during the flyback period and the 1st half Frame period as well. C2463 is charged by D6457 during the 2nd half scanning. R3467 and R3468 are for oscillation damping.

The V_guard protection is to protect the Frame stage if a fault condition happens. The V_guard will sense the pulse with voltage > 3.8 V and period < 900 us. Any signal out of this range will be considered as fault, and the chassis will be shut down.

9.3.8 Tilt and Rotation

The rotation control signal is a PWM output from the UOC. It is filtered by R3252, R3246, R3259 and C2259. The DC voltage after filtering at C2259 will be amplified by R3245 (Main Board) and R3390 (CRT panel).
The output stage functions similarly as in L01.1 with rotation IC TDA8941P. TS7331/TS7382 and TS7332/TS7381 will function alternatively corresponding to the rotation setting.

9.3.9 CRT panel

The RGB amplifier stage is exactly the same as in L01.1. However, the RGB amplifier IC has been changed to TDA6107AJF or TDA6108AJF. The “A” indication is with gain of “80” rather than “50” in L01.1. The diode D6332 used in the former chassis, to solve the bright screen during start up, is not required because this IC has the error correction implemented.

Scavem

In certain versions, the Scavem feature is used to enhance the sharpness of the picture. The RGB signals are first differentiated and subsequently amplified before feeding to an auxiliary coil known as the SVM coil. The current, flowing through the SVM coil during the picture intensity transients, modulates the deflection field and thus the scan velocity.

During the first half of the intensity increase, the scan velocity is increased (thus decreasing the current density by spreading

it on a wider area). During the second half of the intensity increase, the scan velocity is decreased (increasing the current density by concentrating it on a smaller area). The increasing current density transition is sharpened. A decreasing current density transition is processed in a similar way and is also sharpened.

In this chassis the SCAVEM signal is different from its predecessor because the Hercules generates the differential SCAVEM signal inside the IC.
The supply of the SCAVEM is taken from V_bat through a 1k5 / 5 W resistor. Compared with the L01.1, this has the advantage of getting better performance for the pattern with tremendous SCAVEM current (like V_sweep). In this former chassis, because the supply was taken from the 200 V through a 8k2 / 5 W resistor, the supply dropped significantly during a large SCAVEM current. In this chassis, the drop due to the pattern will be less because of the lower supply voltage impedance.
In the Main Board, 1st stage amplification is taken care by 7208 with the pull up resistors (3361, 3387) located in the CRT panel.

TS7361 and TS7362 is the current buffer delivering the current to the output stage. The diode D6361 is to lightly bias these transistors, to get rid of the zero crossover of the stage.
After that, the signal is ac-coupled to TS7363 and TS7364 where the emitter resistors (R3364 and R3370) will determine the final SCAVEM current. TS7363 and TS7364 are biased by R3363, R3366, R3367 and R3368.
C2387, R3388, R3389, R3365, R3369, C2384, and C2385 are used for suppressing unwanted oscillations.
The function of TS7376 is to limit the SCAVEM current from going too high. It basically senses the voltage after R3373 and clamps the SCAVEM signal through D6367 and C2376.

9.4 Control

The Micro Controller is integrated with the Video Processor, and is called the Hercules. For dynamic data storage, such as SMART PICTURE and SMART SOUND settings, an external NVM IC is being used.
Another feature includes an optional Teletext/Closed Caption decoder with the possibility of different page storage depending on the Hercules type number.

The Micro Controller ranges in ROM from 128 kB with no TXT-decoder to 128 kB with a 10 page Teletext or with Closed Caption.

9.4.1 Block Diagram

The block diagram of the Micro Controller application is shown below.

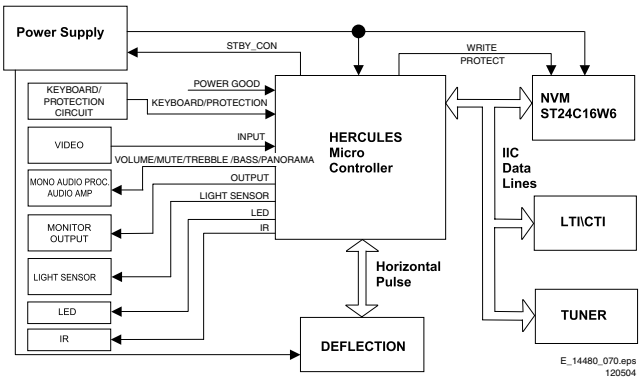


Figure 9-4 Micro Controller block diagram

9.4.2 Basic Specification

The Micro Controller operates at the following supply voltages:

- +3.3 V_dc at pins 33, 125, and 19.
- +1.8 V_dc at pins 126, 36, and 33.
- I2C pull up supply: +3.3V_dc.

9.4.3 Pin Configuration and Functionality

The ports of the Micro Controller can be configured as follows:
- A normal input port.
- An input ADC port.
- An output Open Drain port.
- An output Push-Pull port.
- An output PWM port.
- Input/Output Port

The following table shows the ports used for the L04 control:

Table 9-4 Micro Controller ports overview

Pin	Name	Description	Configuration
32	INT0/ P0.5	IR	INT0
31	P1.0/ INT1	PWRDOWN	INT1
30	P1.1/ T0	LED	P1.1
27	P0.4/ I2SWS	(for future use)	-
26	P0.3/ I2SCLK	(for future use)	-
25	P0.2/ I2SDO2	SEL_SC2_INTERFACE/ SDM	P0.2
24	P0.1/ I2SDO1	(for future use)	P0.1
23	P0.0/ I2SDI/O	Panorama	P0.0
22	P1.3/ T1	Write Protect	P1.3
21	P1.6/ SCL	SCL	SCL
20	P1.7/ SDA	SDA	SDA
18	P2.0/ TPWM	VOL_MUTE	P2.0
17	P2.1/ PWM0	ROTATION	PWM0
16	P2.2/ PWM1	SEL_LL'/M	P2.2
15	P2.3/ PWM2	STANDBY_CON	P2.3
14	P3.0/ ADC0	Light Sensor	ADC0
13	P3.1/ ADC1	(for future use)	-
10	P3.2/ ADC2	(for future use)	-
9	P3.3/ ADC3	KEYBOARD	ADC3
7	P2.4/ PWM3	A (for future use)	P2.4
6	P2.5/ PWM4	B (for future use)	P2.5
3	P1.2/ INT2	C (for future use)	INT2
2	P1.4/ RX	E (for future use)	-
1	P1.5/ TX	D (for future use)	-

The description of each functional pin is explained below:
- **LED.** This signal is used as an indication for the Standby, Remote and Error Indicator. Region diversity:
  - During protection mode, the LED blinks and the set is in standby mode.
  - During error conditions it blinks at a predefined rate.
  - After receiving a valid RC-5 or local keyboard command it flashes once.
  - For sets with error message indication, the LED blinks when message is active and the set is in standby mode.

Table 9-5 LED signal diversity

LED	Europe		AP/ LATAM		NAFTA	
0	LED brighter	Standby	LED lighted	Standby	LED lighted	Normal
1	LED dimmer	Normal	LED "off"	Normal	LED "off"	Standby

- **SCL.** This is the clock wire of the two-wire single master bi-directional I2C bus.
- **SDA.** This is the data wire of the two-wire single master bi-directional I2C bus.
- **STDBY_CON.** The Hercules generates this signal. This can enable the MAIN SMPS in normal operation and disable it during Standby. It is of logic “low” (0 V) under normal operation and “high” (3.3 V) during Standby.
- **IR.** This input pin is connected to an RC5 remote control receiver.

- **SEL-IF-LL'/ M-TRAP.** For AP: All L04 AP sets are Multi System QSS set. This is an output pin to switch the Video SAW filter between M system and other systems.
  – 0: NTSC M (default)
  – 1: PAL B/G, DK, I, L
- **Write Protect.** The global protection line is used to enable and disable write protection to the NVM. When write to the NVM is required, pin 7 of the NVM must be pulled to logic '0' first (via Write_Protect of the micro-controller pin) before a write is performed. Otherwise pin 7 of NVM must always be at logic "1"
  – 0: Disabled
  – 1: Enabled (default)
- **Mute.** This pin is use to MUTE the audio amplifier. It is configured as push pull.
- **Rotation.** This pin is configured as PWM for the Rotation feature. The output of the PWM is proportional to the feature control.
- **Light Sensor.** This pin is configured as ADC input for the Light Sensor.
- **Sel_SC2_Interface.** This pin is use to switch between the SC2_CVBS_OUT and the INTF_CVBS_OUT for the SCART_2_CVBS_OUT/ MONITOR_OUT signal.
  – 0: Hercules CVBS Output (default)
  – 1: Interface CVBS Output
- **PWRDOWN.** The AUX SMPS generates this signal. Logic "high" (3.3 V) under normal operation of the TV and goes "low" (0 V) when the Mains input voltage supply goes below 70 V_ac.
- **Keyboard.** Following are the Keyboard functions and the step values (8 bit) for it.

Table 9-6 Local keyboard values

Function	Voltage (V_dc)	Step values (8 bit)
NAFTA Standby	0	0 - 6
Ch +	0.43	7 - 33
Exit Factory (Ch- and Vol-)	0.69	34 - 53
Ch -	0.93	54 - 73
Menu (Vol - and Vol +)	1.19	74 - 96
Vol -	1.49	97 - 121
DVD Eject	1.8	122 - 147
Vol +	2.12	148 - 169

- **SDM.** This pin is configured as Open Drain during the cold start only. If this pin is shorted to ground during cold start, it will enter the SDM mode (for Service use).
- **ISP.** This pin is configured as Open Drain during the cold start only. If this pin is shorted to ground during cold start, it will enter the ISP mode (for Service use).
- **PANEL.** This pin is configured as Open Drain during the cold start only. If this pin is shorted to ground during that, then it will enter to the PANEL mode.
- **ResetEnabled.** This is an output pin to switch the control transistor (pos. TS7202) "high" or "low" for the reset of 1.8 V in case there is a corruption in the Hercules.

9.5 Tuner and IF

The tuner used in this chassis comes from two sources, from Philips and from Alps. Both tuner sources have the same pin configuration so they are 1 to 1 compatible except for the software, which will be selected by means of Option Settings.

Some features:
- Multi-Standard alignment free PLL-IF, including SECAM L/ L'.
- Integrated IF-AGC time constant.
- Integrated sound band-passes and traps (4.5 / 5.5 / 6.0 / 6.5 MHz).
- Group delay compensation (for NTSC and for PAL).
- QSS versions with digital Second-Sound-IF SSIF (AM demodulator for free).
- FM mono operation possible: Inter-Carrier or QSS.

9.5.1 Diversity

The following Tuners can be present (depending on the region and the set execution):
- Normal tuner without PIP.
- FM radio tuner without PIP.
- Normal tuner with PIP (main tuner with splitter).
- FM radio set with PIP (PIP tuner with splitter).

The SAW filter used, depends on the application concept (whether it is a QSS concept or an Intercarrier):
- OFWM3953M for QSS Video.
- OFWK9656M for QSS Audio.
- OFWM1971M for Intercarrier.

9.5.2 Pin Assignments and Functionality

Pin assignment of the Tuner:

Table 9-7 Pinning Tuner

Pin	Pin Description	DC Voltages
1	RF-AGC	4V for Maximum Gain < 4V for Strong Signal Condition
2	FM Radio Input or N.C	-
3	NC (Address Pin)	-
4	SCL	0 to 3.3 V_dc
5	SDA	0 to 3.3 V_dc
6/7	Supply Voltage	5 V_dc +/- 0.25 V
8	N.C	-
9	Tuning Supply Voltage	30 to 35 V_dc
10	FM Radio IF Output/Ground	-
11	TV IF Output	-

Pin assignment of the several SAW filters (depends on region/ execution):

Table 9-8 Pinning SAW filters

Pin	QSS Video (item 1002)	QSS Video (item 1003)	QSS Audio (item 1001)	Intercarrier (item 1002)
1	Input	Input	Input	Input
2	Input Ground	Input Ground	Switching Input	Input Ground
3	Ground	Ground	Ground	Ground
4	Output	Output	Output	Output
5	Output	Output	Output	Output
6	-	n.c.	-	-
7	-	n.c.	-	-
8	-	Ground	-	-
9	-	Free	-	-
10	-	Switching input	-	-

The table below shows the switching behavior of SAW filter.

Table 9-9 Switching behavior SAW filter

	Condition	
	High	Low
System	M	BG/DK/I/L

Note: The logic level is measured at the base of transistor 7001.

9.5.3 Option Settings

The option settings for the Tuner type can be found in Option setting 1 of the SAM mode. The Option settings for Option 1 are as follows:
- Option Byte 1
  – Bit 7: OP_PHILIPS_TUNER

- Bit 6: OP_FM_RADIO
- Bit 5: OP_LNA
- Bit 4: OP_ATS
- Bit 3: OP_ACI
- Bit 2: OP_UK_PNP
- Bit 1: OP_VIRGIN_MODE
- Bit 0: OP_CHINA

For more details on the option settings, please refer to the chapter 8 “Alignments”.

9.6 Source Select

For this chassis, the audio/video source selection is controlled via the Hercules.
The Audio/Video Source Select is one of the more complex functions due to its diversity and complex switching. The Audio/Video Source Select comprises of the following components:

- The Hercules itself for Mono Audio and Video Source Selection.
- The HEF switch for Stereo Audio as well as Video Selection.

9.6.1 Options

The option settings for the Source Selection can be found in Option settings of the SAM mode. The Option settings for Option 5 are as follows:

- Option Byte 5
  - Bit 7: AV1
  - Bit 6: AV2
  - Bit 5: AV3
  - Bit 4: CVI
  - Bit 3: SVHS2
  - Bit 2: SVHS3
  - Bit 1: HOTEL MODE
  - Bit 0:

For more detail on the option settings, please refer to the chapter 8 “Alignments”.

9.6.2 Diversity

The basic diversity of the Audio/Video Source Select is between the Mono and the Stereo sets and the number of Cinch/SCART’s as specified in the product specification. The table below shows the Audio/Video Source Select diversity for all regions:

Table 9-10 AV Source Select diversity

Pin	Symbol	Remark
51	R/Pr IN3	AV1 (CVI)
50	G/Y IN3	
49	B/Pb IN3	
52	INSSW3	
74	CVBS2/Y2	
95	AUDIO IN5 L	
94	AUDIO IN5 R	
73	AUDIO IN3 L	AV2 (SVHS)
72	AUDIO IN3 R	
71	CVBS3/Y3	
70	C2/C3	
80	AUDIO IN4 L	Side (SHVS)
79	AUDIO IN4 R	
78	CVBS4/Y4	
77	C4	
81	IFVO/SVO/CVBSI	Monitor Out
67	AUD OUT HP L	
66	AUD OUT HP R	
69	AUD OUT LS L (AUD OUT/AM OUT)	HP/ LS Out
68	AUD OUT LS R	
59	V IN (R/Pr IN2/CX)	Interface
58	U IN (B/Pb IN2)	
57	Y IN (G/Y IN2/CVBS-Yx)	
54	U OUT (INSSW2)	
76	AUDIO IN2 L	
75	AUDIO IN2 R	
86	DVBO/IFVO/FMRO	N.C.
65	CVBSO/PIP	PIP application
56	Y SYNC	100 nF
55	Y OUT	100 nF
53	V OUT (SWO)	N.C.
93	AUD OUT S L	N.C.
92	AUD OUT S R	N.C.

Table 9-11 SCART Source Select diversity

Pin	Symbol	Remark
51	R/Pr IN3	SCART 1
50	G/Y IN3	
49	B/Pb IN3	
52	INSSW3	
74	CVBS2/Y2	
86	DVBO/IFVO/FMRO	
95	AUDIO IN5 L	
94	AUDIO IN5 R	
93	AUD OUT S L	
92	AUD OUT S R	
71	CVBS3/Y3	SCART 2
70	C2/C3	
81	IFVO/SVO/CVBSI	
73	AUDIO IN3 L	
72	AUDIO IN3 R	
67	AUD OUT HP L	
66	AUD OUT HP R	
80	AUDIO IN4 L	Side I/O
79	AUDIO IN4 R	
78	CVBS4/Y4	
77	C4	
69	AUD OUT LS L (AUD OUT/AM OUT)	LS/ HP/ MON OUT
68	AUD OUT LS R	
59	V IN (R/Pr IN2/CX)	Interface
58	U IN (B/Pb IN2)	
57	Y IN (G/Y IN2/CVBS-Yx)	
54	U OUT(INSSW2)	
76	AUDIO IN2 L	
75	AUDIO IN2 R	
65	CVBSO/PIP	for PIP
56	YSYNC	100 nF
55	YOUT	100 nF
53	VOUT(SWO)	N.C.

9.6.3 Audio Source Selection

The signals coming out of the DEMDEC (internal demodulator/decoder block of the Hercules) are selectable and consist of the following (depending on the transmission):

- DEC L/R (Can be NICAM, FM 2CS, or BTSC Stereo).
- Mono (Refers to fallback/forced Mono in Stereo Transmission).
- SAP.

For L04, the assigned I/O with respect to the Hercules is as follows:

- SCART1 or AV1 Input assigned to **Audio In 5**.
- SCART2 or AV2 Input assigned to **Audio In 3**.
- Side AV Input assigned to **Audio In 4**.
- External Interface Input assigned **to Audio In 2**.
- SCART1 Output assigned to **SCART Output**.
- SCART2 Output (EU) or Monitor Output (LA/NA/AP) assigned to **Headphone Output**.
- Constant Level Output assigned to **Loudspeaker Output**.

9.6.4 Video Source Selection

Video source selection is done inside the Hercules. Therefore it provides a video switch with 3 external CVBS inputs and a CVBS output. All CVBS inputs can be used as Y-input for Y/C signals. However, only 2 Y/C sources can be selected because the circuit has 2 chroma inputs.
All input signals are converted to YUV, and looped through an external interface. This to enable picture improvement features (like LTI/CTI) or PIP.

9.7 Video Processing

The Video Processor is basically the Hercules and the TDA9178 (CTI/LTI). Video processing is done in these two chips such as the Brightness Control, Contrast Control and so on.

Some features:
- Full YUV-loop interface (alternative functions: DVD, RGB or Y/C).
- Internal OSD insertion (not Saturation or Contrast controlled).
- Double window implementation.
- Linear / non linear scaling for 16:9 sets.
- Tint (hue) on UV signals (including DVD).
- Peaking, Coring, Black \ Blue \ White-stretch.
- Transfer-Ratio and Scavem (also on TXT).

9.7.1 Features

The features included in the Hercules are as follows:
- Brightness Control.
- Contrast Control.
- Saturation Control.
- Sharpness Control.
- Peak White Limiter.
- Beam Current Limiter.
- Black Stretch (Contrast Plus).

For sets with the TDA9178, there are two extra features:
- Luminance Transient Improvement (LTI).
- Color Transient Improvement (CTI).

9.7.2 Block Diagram

Following diagram is the block diagram of the video processing part:

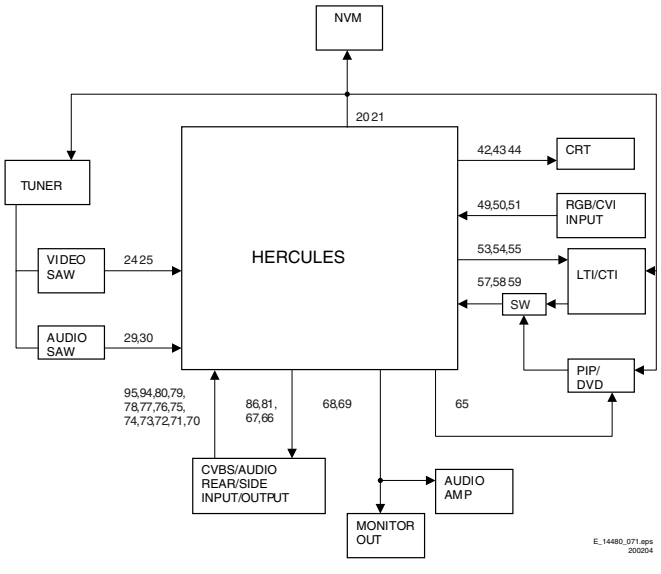


Figure 9-5 Video processing block diagram

9.7.3 LTI/CTI

The TDA9178 is an I2C-bus controlled IC (INCREDIBLE chip) with YUV interface. This IC can do mainly histogram processing, color transient improvement (CTI) and line transient improvement (LTI).
- Luminance Vector Processing involves histogram function, which provides scene dependent contrast improvement, adaptive black and white point stretching.
- Color Vector Processing involves skin tone correction, green enhancement and blue stretch.
- Spectral Processor involves step improvement processing, contour processing, smart sharpness control, color dependant sharpness and Color Transient Improvement.
- Noise detector, feature mode detector and cue flash functions.
- Demonstration mode shows all the improvement features in one picture.

Table 9-12 Pinning overview TDA9178

Pin	Symbol	Description
1	SC	Sandcastle input pin
2	n.c.	Not connected pin
3	ADEXT1	External AD-conversion #1 input pin
4	ADEXT2	External AD-conversion #2 input pin
5	ADEXT3	External AD-conversion #3 input pin
6	Y in	Luminance input pin
7	ADR	Address selection input pin
8	U in	-(B-Y) signal input pin
9	V in	-(R-Y) signal input pin
10	TP	Testpin, connected to ground
11	SCL	I2C-bus: clock input pin
12	n.c.	Not connected pin
13	n.c.	Not connected pin
14	SDA	I2C-bus: data input pin
15	DECDIG	Decoupling digital supply
16	V out	-(R-Y) signal output pin
17	U out	-(B-Y) signal output pin
18	V ee	Ground pin
19	Y out	Luminance output pin
20	V cc	Supply-voltage pin
21	S out	Luminance output for SCAVEM
22	CF	Cue-flash output pin
23	n.c.	Not connected pin
24	n.c.	Not connected pin

9.7.4 Options

The option settings allow for process of the video as per set specification. The option settings can be found in “Option 2” and “Option 6” in the SAM mode. The option settings are as follows:
- Option Byte 2
  - Bit 7:
  - Bit 6 :OP_GREEN_UI
  - Bit 5: OP_CHANNEL_NAMING,
  - Bit 4: OP_LTI,
  - Bit 3: OP_TILT,
  - Bit 2: OP_FINE_TUNING
  - Bit 1: OP_PIP_PHILIPS_TUNER,
  - Bit 0: OP_HUE,
- Option Byte 6
  - Bit 7: OP_PERSONAL_ZAPPING,
  - Bit 6:
  - Bit 5: OP_FMTRAP
  - Bit 4: OP_COMBFILTER
  - Bit 3: OP_ACTIVE_CONTROL
  - Bit 2: OP_VIDEO_TEXT
  - Bit 1 :OP_LIGHT_SENSOR,
  - Bit 0: OP_DUAL_TEXT

For more details on the option settings, please refer to the chapter 8 “Alignments”.

9.8 Audio Processing

The audio decoding is done entirely via the Hercules. The IF output from the Tuner is fed directly to either the Video-IF or the Sound-IF input depending on the type of concept chosen. There are mainly two types of decoder in the Hercules, an analog decoder that decodes only Mono, regardless of any standards, and a digital decoder (or DEMDEC) that can decode both Mono as well as Stereo, again regardless of any standards.

In this chassis, the analog decoder is used in two cases:
- It is used for AM Sound demodulation in the Europe SECAM LL' transmission.
- It is used for all FM demodulation in AP AV-Stereo sets.

9.8.1 Diversity

The diversity for the Audio decoding can be broken up into two main concepts:
- The Quasi Split Sound concept used in Europe and some AP sets.
- The Inter Carrier concept, used in NAFTA and LATAM.

The UOC-III family makes no difference anymore between QSS- and Intercarrier IF, nearly all types are software-switchable between the two SAW-filter constructions.

Simple data settings are required for the set to determine whether it is using the Inter Carrier or the QSS concept. These settings are done via the "QSS" and "FMI" bit found in SAM mode. Due to the diversity involved, the data for the 2 bits are being placed in the NVM location and it is required to write once during startup.

On top of that, it can be further broken down into various systems depending on the region. The systems or region chosen, will in turn affect the type of sound standard that is/are allowed to be decoded.
- For the case of **Europe**, the standard consists of BG/DK/I/LL' for a Multi-System set. There are also versions of Eastern Europe and Western Europe set and the standard for decoding will be BG/DK and I/DK respectively. FM Radio is a feature diversity for the Europe sets. The same version can have either FM Radio or not, independent of the system (e.g. sets with BG/DK/I/LL' can have or not have FM radio).
- For the case of **NAFTA** and **LATAM**, there is only one transmission standard, which is the M standard. The diversity then will be based on whether it has a dBx noise reduction or a Non-dBx (no dBx noise reduction).
- For the case of **AP**, the standard consists of BG/DK/I/M for a Multi-System set. The diversity here will then depend on the region. AP China can have a Multi-System and I/DK version. For India, it might only be BG standard.

9.8.2 Functionality

The features available in the Hercules are as follows:
- Treble and Bass Control.
- Surround Sound Effect that includes:
  - Incredible Stereo.
  - Incredible Mono.
  - 3D Sound (not for AV Stereo).
  - TrueSurround (not for AV Stereo).
  - Virtual Dolby Surround, VDS422 (not for AV Stereo).
  - Virtual Dolby Surround, VDS423 (not for AV Stereo).
  - Dolby Pro-Logic (not for AV Stereo).
- Bass Feature that includes:
  - Dynamic Ultra-Bass.
  - Dynamic Bass Enhancement.
  - BBE (not for AV Stereo).
- Auto-Volume Leveler.
- 5 Band Equalizer.
- Loudness Control.

All the features stated are available for the Full Stereo versions and limited features for the AV Stereo

9.9 Audio Amplifier

The audio amplifier part is very straightforward. It uses the integrated power amplifier TDA2616Q, and delivers a maximum output of 2 x 10 W_rms.
The maximum operating condition for this amplifier is 21 V unloaded. Normal operating supply is from 7.5 V to 16 V. Muting is done via the VOLUME_MUTE line connected to pin 2 of the amplifier-IC and coming from the UOC.

The following table shows pin functionality of the Audio Amplifier:

Table 9-13 Pinning overview TDA2616

Pin	Pin Name	Normal Operation
1	Input Left	Input AC signal
2	Mute	16 V_dc
3	Ground	0 V
4	Output L Channel	AC waveform
5	Supply Voltage (negative)	-16 V_dc
6	Output R Channel	AC waveform
7	Supply Voltage (positive)	+ 16 V_dc
8	Inverting inputs L and R	0 V
9	Input Right	Input AC signal

9.10 Abbreviation List

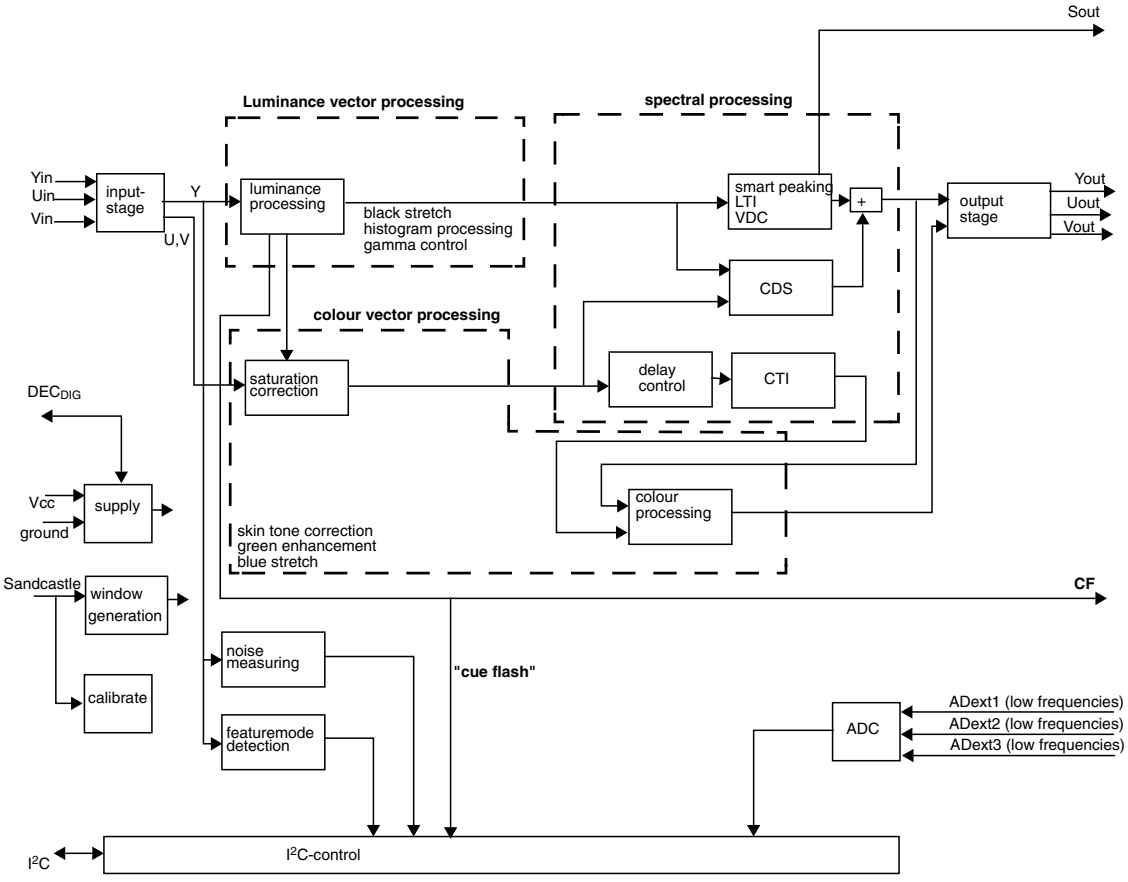
2CS	2 Carrier (or Channel) Stereo
ACI	Automatic Channel Installation: algorithm that installs TV sets directly from cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AFT	Automatic Fine Tuning
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AP	Asia Pacific region
AR	Aspect Ratio: 4 by 3 or 16 by 9
ATS	Automatic Tuning System
AV	External Audio Video
AVL	Automatic Volume Leveler
BCL	Beam Current Limitation
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
CC	Closed Caption
CCC	Continuous Cathode Calibration
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Color Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
CVI	Component Video Input
DAC	Digital to Analogue Converter
DBX	Dynamic Bass Expander or noise reduction system in BTSC
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Direction For Use: description for the end user
DNR	Dynamic Noise Reduction
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode
DVD	Digital Versatile Disc
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EHT-INFO	Extra High Tension information
EPG	Electronic Programming Guide
EU	Europe
EW	East West, related to horizontal deflection of the set
EXT	External (source), entering the set via SCART or Cinch
FBL	Fast Blanking: DC signal accompanying RGB signals
FILAMENT	Filament of CRT
FM	Field Memory or Frequency Modulation
H	Horizontal sync signal
HP	Headphone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
IF	Intermediate Frequency
IIC	Integrated IC bus
ITV	Institutional TV
LATAM	Latin American countries like Brazil, Argentina, etc.
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LS	Large Screen or Loudspeaker
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTSC	National Television Standard Committee. Color system mainly used in North America and Japan. Color carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data e.g. alignments
OB	Option Bit
OC	Open Circuit
OP	Option Byte
OSD	On Screen Display
PAL	Phase Alternating Line. Color system mainly used in West Europe (color carrier = 4.433619 MHz) and South America (color carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PCB	Printed Circuit board
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power-On Reset
PTP	Picture Tube Panel (or CRT-panel)
RAM	Random Access Memory
RC	Remote Control handset
RGB	Red, Green, and Blue video signals
ROM	Read Only Memory
SDAM	Service Default / Alignment Mode
SAP	Second Audio Program
SC	Sandcastle: pulse derived from sync signals
S/C	Short Circuit
SCL	Serial Clock
SDA	Serial Data
SECAM	SEequence Couleur Avec Memoire. Color system mainly used in France and East Europe. Color carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SS	Small Screen
STBY	Standby
SVHS	Super Video Home System
SW	Software
THD	Total Harmonic Distortion
TXT	Teletext
uP	Microprocessor
UOC	Ultimate One Chip
V	Vertical sync signal
V_BAT	Main supply voltage for the deflection stage (mostly 141 V)
V-chip	Violence Chip
VCR	Video Cassette Recorder
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YC	Luminance (Y) and Chrominance (C) signal

9.11 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.11.1 Diagram H, TDA9178 (IC7610)

BLOCK DIAGRAM



PIN CONFIGURATION

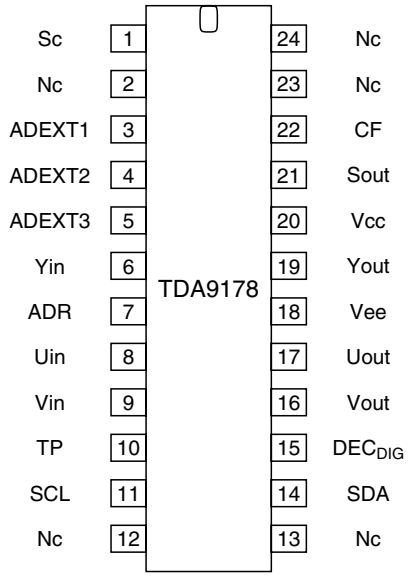


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Figure 9-6 Internal Block Diagram and Pin Configuration

10. Spare Parts List

Set Level

Various

0029	3139 177 77971	AS LENS 25SYRFA/B/ INDIGO BLACK
s001	3139 137 23881	External Power Supply (EPS4)
s002	3139 188 60981	UIR SP External Speakers Panel
s003	3139 188 61481	Interface Module

⎓

5213	2422 264 00482	Loudsp. 16Ω 10W fullrange
5214	2422 264 00476	LSP 16R 10W SCR FULR O45X154 B

Mono Carrier [A]

Various

1000	3139 147 16481	UV1356A/AIG-3
1001	2422 549 44684	Filter 38MHz
1003	2422 549 44683	SAW OFWK6274K
1005	4822 267 10748	Connector 3p
1010	4822 267 10676	RT-01T-1.0B (1P)
1137	2422 026 05659	Socket 4P f
1204	4822 265 41113	7P
1205	2422 543 01421	Xtal 24.576MHz
1207	2422 025 11244	Connector 7p m
1212	2422 025 17042	Connector 7P m
1213	2422 025 11244	Connector 7p m
1219	2422 025 17408	Connector 9p m
1220	2422 025 12482	Connector 6p m
1220	4822 267 10735	Connector 3p
1222	2422 025 15849	Connector 6p m
1223	2422 026 05477	Socket CINCH 9Pf
1227	2422 025 16383	Connector 3p m
1229	4822 267 10735	Connector 3p
1232	4822 267 51391	Connector Phone
1236	2422 025 16382	Connector 3p m
1250	2422 026 05538	Soc cinch 3p
1251	2422 026 05428	Connector 4p f
1252	2422 025 11244	Connector 7p m
1254	4822 267 10734	Connector 5p
1262	2422 025 16937	Connector 3P f
1278	4822 267 10565	Connector 4p
1280	4822 267 10734	Connector 5p
1401	4822 265 30735	Connector 5p
1404	4822 267 10966	Connector 2p
1451	2422 025 10646	Connector 2p m
1452	4822 071 51252	Fuse 1.25A
1454	4822 071 51252	Fuse 1.25A
1500	2422 086 10914	Fuse 4A 250V
1501	2422 090 01101	Soc Fuse 1P Female
1502	2422 090 01101	Soc Fuse 1P Female
1503	2422 132 07467	Relay 1p 12V 5A LKS1AF
1504	4822 267 10774	Connector 2p male (red)
1505	4822 265 20723	Connector 2p
1506	2422 128 03111	Switch
1600	4822 276 13775	Switch 1p 0.1A 12V
1601	4822 276 13775	Switch 1p 0.1A 12V
1602	4822 276 13775	Switch 1p 0.1A 12V
1603	4822 276 13775	Switch 1p 0.1A 12V
1692	2422 025 15848	Connector 5p m
8204	3139 131 03591	Cable 7P 560mm
8280	3139 110 38861	Cable 5p/680/5p
8401	3139 121 09041	Cable 5p/560/5p

⊣⊢

2001	4822 122 33761	22pF 5% 50V
2002	4822 122 33761	22pF 5% 50V
2003	5322 126 11583	10nF 10% 50V 0603
2004	3198 024 44730	47nF 50V 0603
2005	4822 124 40769	4.7µF 20% 100V
2006	4822 124 80791	470µF 20% 16V
2007	2238 586 59812	100nF 20% 50V 0603
2008	4822 124 40207	100µF 20% 25V
2103	4822 126 14241	330pF 0603 50V
2104	4822 126 14241	330pF 0603 50V
2105	3198 028 41090	10µF 20% 35V
2106	3198 028 41090	10µF 20% 35V
2131	4822 126 14241	330pF 0603 50V
2132	4822 124 22652	2.2µF 20% 50V
2133	4822 126 14241	330pF 0603 50V
2134	4822 124 22652	2.2µF 20% 50V
2203	4822 124 41584	100µF 20% 10V
2204	2238 916 15641	22nF 10% 25V 0603
2205	4822 126 13879	220nF +80-20% 16V
2206	4822 126 13879	220nF +80-20% 16V
2207	4822 126 13879	220nF +80-20% 16V
2208	4822 126 13879	220nF +80-20% 16V
2209	4822 126 13879	220nF +80-20% 16V
2210	4822 126 13879	220nF +80-20% 16V
2211	4822 126 13879	220nF +80-20% 16V
2212	4822 126 13879	220nF +80-20% 16V
2213	4822 126 13879	220nF +80-20% 16V
2214	2238 586 59812	100nF 20% 50V 0603
2215	4822 126 13879	220nF +80-20% 16V
2216	4822 126 13879	220nF +80-20% 16V
2217	4822 124 40207	100µF 20% 25V
2218	4822 124 40433	47µF 20% 25V
2223	2238 586 59812	100nF 20% 50V 0603
2224	4822 124 40207	100µF 20% 25V
2225	4822 126 13879	220nF +80-20% 16V
2226	4822 126 13879	220nF +80-20% 16V
2229	4822 126 13879	220nF +80-20% 16V
2230	4822 124 40248	10µF 20% 63V
2231	2238 586 59812	100nF 20% 50V 0603
2232	2238 586 59812	100nF 20% 50V 0603
2233	2238 586 59812	100nF 20% 50V 0603
2234	4822 124 40207	100µF 20% 25V
2235	5322 126 11582	6.8nF 10% 63V
2236	5322 126 11583	10nF 10% 50V 0603
2237	2238 586 59812	100nF 20% 50V 0603
2238	4822 126 13879	220nF +80-20% 16V
2239	4822 126 13879	220nF +80-20% 16V
2240	4822 124 41631	1.5µF 50V
2241	2238 916 15641	22nF 10% 25V 0603
2242	2238 586 59812	100nF 20% 50V 0603
2243	2238 586 59812	100nF 20% 50V 0603
2244	4822 126 14491	2.2µF 10V 0805
2245	3198 016 31020	1nF 25V 0603
2246	2238 586 59812	100nF 20% 50V 0603
2247	2238 586 59812	100nF 20% 50V 0603
2248	5322 122 31647	1nF 10% 63V
2249	2238 586 59812	100nF 20% 50V 0603
2250	4822 124 40207	100µF 20% 25V
2251	2022 318 00212	150nF 50V
2252	5322 126 11583	10nF 10% 50V 0603
2253	5322 126 11583	10nF 10% 50V 0603
2254	5322 126 11578	1nF 10% 50V 0603
2255	5322 126 11583	10nF 10% 50V 0603
2256	2238 586 59812	100nF 20% 50V 0603
2257	5322 126 11579	3.3nF 10% 63V
2259	3198 017 41050	1µF 10V 0603
2260	2238 586 59812	100nF 20% 50V 0603
2261	2238 586 59812	100nF 20% 50V 0603
2262	5322 126 11583	10nF 10% 50V 0603
2263	2238 586 59812	100nF 20% 50V 0603
2264	4822 126 14249	560pF 10% 50V 0603
2265	4822 124 40207	100µF 20% 25V
2266	4822 126 14491	2.2µF 10V 0805
2267	4822 126 14491	2.2µF 10V 0805
2268	4822 122 33741	10pF 10% 50V
2269	4822 122 33741	10pF 10% 50V
2272	2238 586 59812	100nF 20% 50V 0603
2273	4822 124 40207	100µF 20% 25V
2274	2238 586 59812	100nF 20% 50V 0603
2275	4822 124 40248	10µF 20% 63V
2276	4822 126 14585	100nF 10% 0805 50V
2279	2020 552 94427	100pF 5% 50V
2280	3198 017 41050	1µF 10V 0603
2282	5322 126 11578	1nF 10% 50V 0603
2288	5322 126 11578	1nF 10% 50V 0603
2289	5322 126 11578	1nF 10% 50V 0603
2290	3198 017 41050	1µF 10V 0603
2330	4822 121 40518	100nF 10% 250V
2331	3198 024 44730	47nF 50V 0603
2332	2020 558 90621	10nF 630V
2333	5322 126 11578	1nF 10% 50V 0603
2334	4822 122 32542	47nF 10% 63V
2361	4822 121 42408	220nF 5% 63V
2362	5322 126 11578	1nF 10% 50V 0603
2363	4822 124 40764	22µF 100V
2364	4822 121 43343	4.7nF 10% 400V
2365	4822 126 13193	4.7nF 10% 63V
2367	5322 124 40641	10µF 20% 100V
2368	4822 124 40764	22µF 100V
2376	2238 916 15641	22nF 10% 25V 0603
2381	4822 124 40207	100µF 20% 25V
2382	2238 586 59812	100nF 20% 50V 0603
2383	2020 552 96723	1µF 20% 25V 0805
2384	4822 126 13883	220pF 5% 50V
2385	4822 126 13883	220pF 5% 50V
2386	2238 586 59812	100nF 20% 50V 0603
2387	4822 122 33761	22pF 5% 50V
2404	4822 124 11936	47µF 20% 160V
2406	4822 126 13185	680pF 10% 500V
2408	2020 552 94427	100pF 5% 50V
2409	2238 586 59812	100nF 20% 50V 0603
2410	4822 126 14585	100nF 10% 0805 50V
2411	4822 126 13435	1.2nF 10% 2kV
2411	4822 126 14138	680pF 10% 2kV
2412	2222 375 24153	15nF 5% 1kV
2413	5322 121 44151	33nF 10% 400V
2414	3198 017 41050	1µF 10V 0603
2415	2022 031 00172	2.2µF 160V
2418	4822 121 43888	360nF 5% 250V
2419	2222 468 90324	2.2µF 100V
2420	3198 017 41050	1µF 10V 0603
2425	3198 017 33330	33nF 20% 16V 0603
2428	3198 017 33330	33nF 20% 16V 0603
2451	4822 121 51356	180nF 10% 63V
2453	4822 126 14043	1µF +80-20% 16V 0805
2454	4822 124 80791	470µF 20% 16V
2456	4822 122 32542	47nF 10% 63V
2457	2022 031 00137	4.7µF 20% 250V
2459	4822 122 31177	470pF 10% 500V
2460	4822 124 80791	470µF 20% 16V
2461	3198 016 31020	1nF 25V 0603
2462	3198 016 31020	1nF 25V 0603
2463	2020 021 91677	100µF 20% 50V
2464	4822 126 13881	470pF 5% 50V
2465	5322 124 40641	10µF 20% 100V
2467	4822 121 70162	10nF 5% 400V
2468	4822 126 13883	220pF 5% 50V
2469	4822 126 13879	220nF +80-20% 16V
2470	2222 601 55649	100nF 10% 100V 1206
2483	3198 017 34730	47nF 16V 0603
2486	2252 508 08255	27pF 500V
2487	5322 122 31647	1nF 10% 63V
2488	2020 557 00002	33pF 200V
2489	5322 126 11583	10nF 10% 50V 0603
2490	4822 122 32542	47nF 10% 63V
2492	4822 126 12278	3300pF10% 2kV
2500	2022 330 00053	470nF 20% 275V
2503	4822 126 12793	2.2nF 10% 2kV
2504	4822 126 12793	2.2nF 10% 2kV
2505	4822 124 12443	220UF 20% 450V
2506	2022 311 00038	33nF 10% 400V
2508	2022 330 00049	100nF 20% 275V
2509	2252 811 95022	1.5nF 20% 250V
2511	4822 124 81151	22µF 50V
2512	2238 586 59812	100nF 20% 50V 0603
2513	4822 126 13881	470pF 5% 50V
2514	4822 126 13862	1.5nF 10% 2kV
2515	4822 126 13881	470pF 5% 50V
2516	2238 586 59812	100nF 20% 50V 0603
2517	5322 126 11578	1nF 10% 50V 0603
2528	4822 121 51252	470nF 5% 63V
2530	2020 557 00005	330pF 100V
2531	4822 126 13881	470pF 5% 50V
2532	2020 552 96823	10µF 16V
2533	4822 126 13193	4.7nF 10% 63V
2534	2020 558 90261	68pF 1kV
2535	4822 124 40184	1000µF 20% 10V
2538	4822 126 13881	470pF 5% 50V
2539	4822 122 31177	470pF 10% 500V
2541	4822 124 40433	47µF 20% 25V
2542	2252 811 95021	1nF 10% 250V
2543	4822 126 10206	2.2nF 10% 500V
2549	2020 552 94427	100pF 5% 50V
2550	2020 557 00002	33pF 200V
2551	4822 126 13449	1nF 10% 2kV
2552	2022 031 00165	100µF 160V
2553	4822 126 14508	180pF 5% 50V 0603
2561	4822 122 31175	1nF 10% 500V
2562	4822 124 80061	1000µF 20% 25V
2563	4822 124 80061	1000µF 20% 25V
2564	4822 126 14585	100nF 10% 0805 50V
2565	4822 122 31175	1nF 10% 500V
2570	2252 811 95017	470pF 10% 250V
2571	3198 017 31530	15nF 20% 50V 0603
2572	5322 126 11583	10nF 10% 50V 0603
2573	2020 552 96683	220nF 10% 50V
2601	3198 016 31020	1nF 25V 0603
2611	4822 124 81286	47µF 20% 16V
2613	2238 586 59812	100nF 20% 50V 0603
2615	2020 552 96305	4.7µF 20-80% 10V
2617	2238 586 59812	100nF 20% 50V 0603

2620	2238 586 59812	100nF 20% 50V 0603
2621	4822 124 40207	100µF 20% 25V
2623	2238 586 59812	100nF 20% 50V 0603
2624	4822 124 40207	100µF 20% 25V
2625	2022 552 05615	2.2µF 10% 6.3V 0805
2626	2222 867 15339	33pF 5% 50V 0603
2627	2222 867 15339	33pF 5% 50V 0603
2628	2222 867 15339	33pF 5% 50V 0603
2629	2222 867 15339	33pF 5% 50V 0603
2630	5322 126 11578	1nF 10% 50V 0603
2691	4822 124 40196	220µF 20% 16V
2986	2238 586 59812	100nF 20% 50V 0603
2987	2238 586 59812	100nF 20% 50V 0603
2988	2238 586 59812	100nF 20% 50V 0603
2989	3198 017 41050	1µF 10V 0603
2990	4822 126 14241	330pF 0603 50V
2992	3198 017 41050	1µF 10V 0603
2993	4822 126 14241	330pF 0603 50V
2994	2238 916 15641	22nF 10% 25V 0603
2995	2238 916 15641	22nF 10% 25V 0603
2996	3198 024 44730	47nF 50V 0603
2997	3198 024 44730	47nF 50V 0603

–WW–

3003	4822 051 30103	10kΩ 5% 0.062W
3005	4822 051 30101	100Ω 5% 0.062W
3006	4822 051 30103	10kΩ 5% 0.062W
3007	4822 051 30222	2.2kΩ 5% 0.062W
3008	4822 051 30682	6.8Ω 5% 0.062W
3009	4822 051 30222	2.2kΩ 5% 0.062W
3101	4822 116 52199	68Ω 5% 0.5W
3103	4822 116 83868	150Ω 5% 0.5W
3104	4822 117 12891	220kΩ 1%
3105	4822 116 83868	150Ω 5% 0.5W
3106	4822 117 12891	220kΩ 1%
3129	4822 051 30759	75Ω 5% 0.062W
3131	4822 116 52257	22kΩ 5% 0.5W
3132	4822 117 12925	47kΩ 1% 0.063W 0603
3133	4822 116 52257	22kΩ 5% 0.5W
3134	4822 117 12925	47kΩ 1% 0.063W 0603
3135	4822 051 30759	75Ω 5% 0.062W
3167	4822 116 52201	75Ω 5% 0.5W
3168	4822 051 30759	75Ω 5% 0.062W
3169	4822 051 30759	75Ω 5% 0.062W
3201	4822 050 11002	1kΩ 1% 0.4W
3202	4822 051 30332	3.3Ω 5% 0.062W
3203	4822 051 30154	150kΩ 5% 0.062W
3204	4822 051 30332	3.3Ω 5% 0.062W
3205	4822 051 30123	12kΩ 5% 0.1W
3206	4822 051 30562	5.6kΩ 5% 0.063W 0603
3207	4822 051 30101	100Ω 5% 0.062W
3208	4822 051 30273	27kΩ 5% 0.062W
3209	3198 021 31080	1Ω 5% 0603
3210	3198 021 31080	1Ω 5% 0603
3211	4822 051 30273	27kΩ 5% 0.062W
3212	4822 051 30109	10Ω 5% 0.062W
3214	4822 051 30101	100Ω 5% 0.062W
3215	4822 116 52283	4.7kΩ 5% 0.5W
3216	4822 051 30109	10Ω 5% 0.062W
3217	4822 051 30103	10kΩ 5% 0.062W
3218	4822 051 30101	100Ω 5% 0.062W
3219	4822 051 30103	10kΩ 5% 0.062W
3220	4822 051 30151	150Ω 5% 0.062W
3221	4822 051 30271	270Ω 5% 0.062W
3222	4822 051 30331	330Ω 5% 0.062W
3224	4822 050 21003	10kΩ 1% 0.6W
3226	4822 051 30101	100Ω 5% 0.062W
3227	4822 051 30101	100Ω 5% 0.062W
3228	4822 051 30101	100Ω 5% 0.062W
3229	4822 051 30152	1.5Ω 5% 0.062W
3230	4822 116 52175	100Ω 5% 0.5W
3231	4822 116 52175	100Ω 5% 0.5W
3232	4822 051 30123	12kΩ 5% 0.1W
3235	4822 051 30102	1kΩ 5% 0.062W
3236	4822 051 30101	100Ω 5% 0.062W
3237	4822 051 30102	1kΩ 5% 0.062W
3238	4822 051 30472	4.7Ω 5% 0.062W
3239	4822 116 52207	1.2kΩ 5% 0.5W
3240	4822 051 30223	22kΩ 5% 0.062W
3241	4822 050 23903	39k 1% 0.6W
3242	4822 117 12925	47kΩ 1% 0.063W 0603
3244	4822 051 30101	100Ω 5% 0.062W
3246	4822 116 52283	4.7kΩ 5% 0.5W
3247	4822 051 30391	390Ω 5% 0.062W
3248	4822 051 30101	100Ω 5% 0.062W
3249	4822 116 52175	100Ω 5% 0.5W
3250	4822 051 30222	2.2kΩ 5% 0.062W
3251	4822 051 30123	12kΩ 5% 0.1W
3252	4822 050 11002	1kΩ 1% 0.4W
3257	4822 051 30101	100Ω 5% 0.062W
3258	4822 116 52175	100Ω 5% 0.5W
3259	4822 051 30103	10kΩ 5% 0.062W
3260	4822 116 52175	100Ω 5% 0.5W
3261	4822 051 30472	4.7Ω 5% 0.062W
3262	4822 051 30101	100Ω 5% 0.062W
3264	4822 051 30109	10Ω 5% 0.062W
3269	4822 051 30101	100Ω 5% 0.062W
3270	4822 116 52175	100Ω 5% 0.5W
3271	4822 051 30391	390Ω 5% 0.062W
3272	4822 117 12968	820Ω 5% 0.62W
3273	4822 051 30102	1kΩ 5% 0.062W
3274	4822 116 52175	100Ω 5% 0.5W
3275	4822 116 52175	100Ω 5% 0.5W
3276	4822 116 52175	100Ω 5% 0.5W
3277	4822 116 52175	100Ω 5% 0.5W
3278	4822 116 52175	100Ω 5% 0.5W
3281	4822 051 30472	4.7Ω 5% 0.062W
3283	4822 051 30472	4.7Ω 5% 0.062W
3284	4822 051 30472	4.7Ω 5% 0.062W
3285	4822 051 30102	1kΩ 5% 0.062W
3287	4822 051 30101	100Ω 5% 0.062W
3289	4822 051 30101	100Ω 5% 0.062W
3290	4822 051 30101	100Ω 5% 0.062W
3291	4822 050 11002	1kΩ 1% 0.4W
3292	4822 117 12925	47kΩ 1% 0.063W 0603
3293	4822 051 30393	39kΩ 5% 0.062W
3294	4822 051 30101	100Ω 5% 0.062W
3295	5322 117 13056	8.2kΩ 1% 0.063W 0603
3296	4822 051 30562	5.6kΩ 5% 0.063W 0603
3297	4822 051 30223	22kΩ 5% 0.062W
3328	4822 051 30101	100Ω 5% 0.062W
3329	4822 051 30101	100Ω 5% 0.062W
3330	4822 051 30101	100Ω 5% 0.062W
3331	4822 116 52175	100Ω 5% 0.5W
3332	3198 013 01520	1.5kΩ 20% 0.5W
3333	4822 116 52175	100Ω 5% 0.5W
3334	3198 013 01520	1.5kΩ 20% 0.5W
3335	4822 116 52175	100Ω 5% 0.5W
3336	3198 013 01520	1.5kΩ 20% 0.5W
3351	4822 052 10101	100Ω 5% 0.33W
3354	3198 013 01520	1.5kΩ 20% 0.5W
3356	4822 050 21009	10Ω 1% 0.6W
3357	2122 552 00004	1mA 18V 0603
3361	4822 051 30152	1.5Ω 5% 0.062W
3362	4822 052 10109	10Ω 5% 0.33W
3363	4822 051 30561	560Ω 5% 0.062W
3365	4822 051 30101	100Ω 5% 0.062W
3366	4822 051 30683	68kΩ 5% 0.062W
3367	4822 116 52297	68kΩ 5% 0.5W
3368	4822 051 30561	560Ω 5% 0.062W
3369	4822 051 30101	100Ω 5% 0.062W
3370	2322 702 60158	1.5Ω
3371	4822 116 83883	470Ω 5% 0.5W
3374	4822 051 30181	180Ω 5% 0.062W
3375	2120 108 92641	180kΩ 1%
3376	4822 051 30683	68kΩ 5% 0.062W
3381	4822 116 52176	10Ω 5% 0.5W
3383	4822 117 11449	2.2kΩ 5% 0.1W 0805
3384	4822 051 30103	10kΩ 5% 0.062W
3385	4822 051 30152	1.5Ω 5% 0.062W
3387	3198 021 31820	1.8kΩ 5% 0.062W 0603
3388	4822 051 30339	33Ω 5% 0.062W
3389	4822 051 30339	33Ω 5% 0.062W
3390	4822 117 11817	1.2kΩ 1% 0.0625W
3401	4822 050 24703	47kΩ 1% 0.6W
3404	4822 117 11151	1Ω 5%
3412	4822 050 11002	1kΩ 1% 0.4W
3414	4822 053 11478	4Ω 5% 2W
3414	4822 053 11688	6.8Ω 5% 2W
3415	4822 116 52175	100Ω 5% 0.5W
3416	4822 051 30479	47Ω 5% 0.062W
3417	4822 053 11153	15kΩ 5% 2W
3418	4822 116 52175	100Ω 5% 0.5W
3420	4822 117 10833	10kΩ 1% 0.1W
3425	4822 050 21004	100kΩ 1% 0.6W
3427	4822 117 11449	2.2kΩ 5% 0.1W 0805
3428	4822 051 20332	2.3kΩ 5% 0.1W
3430	2322 241 53124	120KΩ
3431	4822 050 28203	82kΩ 1% 0.6W
3440	4822 116 52226	560Ω 5% 0.5W
3441	2322 241 53124	120KΩ
3445	4822 051 20479	47Ω 5% 0.1W
3446	4822 051 30101	100Ω 5% 0.062W
3451	2312 915 16803	68kΩ 1% 0.5W
3452	4822 051 30153	15kΩ 5% 0.062W
3453	4822 051 30393	39kΩ 5% 0.062W
3454	4822 116 83884	47kΩ 5% 0.5W
3455	4822 052 11108	1Ω 5% 0.5W
3457	4822 052 11108	1Ω 5% 0.5W
3458	4822 052 11478	4.7Ω 5% 0.5W
3460	4822 116 52256	2.2kΩ 5% 0.5W
3461	4822 116 52256	2.2kΩ 5% 0.5W
3462	4822 051 30222	2.2kΩ 5% 0.062W
3463	4822 051 30102	1kΩ 5% 0.062W
3464	4822 051 20391	390Ω 5% 0.1W
3465	4822 051 20391	390Ω 5% 0.1W
3466	4822 052 11108	1Ω 5% 0.5W
3467	4822 116 52206	120Ω 5% 0.5W
3468	4822 116 83868	150Ω 5% 0.5W
3469	4822 051 30102	1kΩ 5% 0.062W
3470	4822 116 52186	22Ω 5% 0.5W
3471	2312 915 12408	2.4Ω
3472	2312 915 12408	2.4Ω
3473	4822 051 30684	680kΩ 5% 0.062W
3474	4822 051 30153	15kΩ 5% 0.062W
3475	5322 117 13056	8.2kΩ 1% 0.063W 0603
3484	4822 052 10108	1Ω 5% 0.33W
3485	4822 052 10108	1Ω 5% 0.33W
3489	4822 051 20479	47Ω 5% 0.1W
3490	4822 051 30223	22kΩ 5% 0.062W
3491	4822 051 30563	56kΩ 5% 0.062W
3493	4822 051 30222	2.2kΩ 5% 0.062W
3495	4822 051 20334	330kΩ 5% 0.1W
3497	4822 052 11108	1Ω 5% 0.5W
3498	4822 051 30472	4.7Ω 5% 0.062W
3499	4822 051 20684	680kΩ 5% 0.1W
3500	4822 053 21335	3.3MΩ 5% 0.5W
3501	4822 053 21335	3.3MΩ 5% 0.5W
3502	4822 116 83872	220Ω 5% 0.5W
3503	4822 252 11215	DSP301N-A21F
3504	4822 053 21155	1.5MΩ 5% 0.5W
3505	2122 550 00171	1mΩ 612V
3506	4822 053 21335	3.3MΩ 5% 0.5W
3508	4822 053 10471	470Ω 5% 1W
3510	2122 612 00055	4.7Ω 3W
3511	4822 050 24708	4.7Ω 1% 0.6W
3512	4822 117 11817	1.2kΩ 1% 0.0625W
3513	4822 052 10222	2.2kΩ 5% 0.33W
3514	4822 052 10479	47Ω 5% 0.33W
3515	4822 050 11002	1kΩ 1% 0.4W
3516	4822 116 83303	0.1Ω 2W
3517	2322 704 63004	300KΩ
3518	4822 051 30332	3.3Ω 5% 0.062W
3519	4822 116 52244	15kΩ 5% 0.5W
3520	4822 117 11342	0.33Ω 5% 2W
3521	4822 116 52269	3.3kΩ 5% 0.5W
3522	4822 051 30563	56kΩ 5% 0.062W
3523	2122 663 00018	4.7Ω 20%
3524	4822 117 12925	47kΩ 1% 0.063W 0603
3527	4822 117 12925	47kΩ 1% 0.063W 0603
3528	4822 051 20105	1MΩ 5% 0.1W
3529	4822 053 20225	2.2MΩ 5% 0.25W
3530	4822 051 30221	220Ω 5% 0.062W
3531	4822 116 52234	100kΩ 5% 0.5W
3532	4822 052 10478	4.7Ω 5% 0.33W
3533	5322 117 13056	8.2kΩ 1% 0.063W 0603
3534	4822 116 52175	100Ω 5% 0.5W
3537	4822 051 30222	2.2kΩ 5% 0.062W
3538	4822 051 20188	1.8Ω 5% 0.1W
3541	4822 117 12925	47kΩ 1% 0.063W 0603
3563	4822 116 83872	220Ω 5% 0.5W
3565	4822 051 30153	15kΩ 5% 0.062W
3571	4822 116 83872	220Ω 5% 0.5W
3572	4822 051 30221	220Ω 5% 0.062W
3573	4822 051 30153	15kΩ 5% 0.062W
3574	4822 116 52245	150kΩ 5% 0.5W
3575	4822 050 28203	82kΩ 1% 0.6W
3576	5322 117 13026	4.7kΩ 1% 0.063W 0603
3577	4822 116 52243	1.5kΩ 5% 0.5W
3578	4822 051 30471	47Ω 5% 0.062W
3579	4822 051 30222	2.2kΩ 5% 0.062W
3601	4822 051 30472	4.7Ω 5% 0.062W
3603	4822 116 52175	100Ω 5% 0.5W
3604	4822 051 30101	100Ω 5% 0.062W
3605	4822 051 30101	100Ω 5% 0.062W
3606	4822 116 52291	56kΩ 5% 0.5W
3607	4822 051 30103	10kΩ 5% 0.062W
3608	4822 051 30273	27kΩ 5% 0.062W
3609	4822 051 30331	330Ω 5% 0.062W
3616	4822 116 52175	100Ω 5% 0.5W
3617	4822 116 52175	100Ω 5% 0.5W
3618	4822 116 52175	100Ω 5% 0.5W
3619	4822 051 30681	680Ω 5% 0.062W
3620	4822 051 30681	680Ω 5% 0.062W
3621	4822 051 30681	680Ω 5% 0.062W
3622	4822 051 30102	1kΩ 5% 0.062W
3623	4822 051 30102	1kΩ 5% 0.062W
3625	4822 051 30109	10Ω 5% 0.062W
3626	4822 051 30109	10Ω 5% 0.062W
3628	4822 051 30109	10Ω 5% 0.062W
3634	4822 051 30102	1kΩ 5% 0.062W
3635	4822 117 12925	47kΩ 1% 0.063W 0603
3637	4822 051 30479	47Ω 5% 0.062W
3681	5322 117 13057	820Ω 1% 0.063W 0603
3684	5322 117 13036	1.2kΩ 1% 0.063W 0603
3685	4822 051 30151	150Ω 5% 0.062W
3686	4822 051 30391	390Ω 5% 0.062W
3687	5322 117 13046	1.8kΩ 1% 0.063W 0603
3691	4822 117 12968	820Ω 5% 0.62W
3693	4822 051 30221	220Ω 5% 0.062W

3694	4822 051 30472	4.7Ω 5% 0.062W
3975	4822 053 11151	150Ω 5% 2W
3985	4822 117 12925	47kΩ 1% 0.063W 0603
3988	4822 051 30103	10kΩ 5% 0.062W
3989	4822 051 30109	10Ω 5% 0.062W
3991	4822 117 12925	47kΩ 1% 0.063W 0603
3992	4822 051 30103	10kΩ 5% 0.062W
3993	4822 051 30109	10Ω 5% 0.062W
3994	4822 051 30683	68kΩ 5% 0.062W
3995	4822 051 30472	4.7Ω 5% 0.062W
4223	4822 051 20008	Jumper 0805
4370	4822 051 20008	Jumper 0805
4533	4822 051 20008	Jumper 0805
4581	4822 051 20008	Jumper 0805
4612	4822 051 20008	Jumper 0805
4644	4822 051 20008	Jumper 0805
4914	4822 051 20008	Jumper 0805
4915	4822 051 20008	Jumper 0805
4916	4822 051 20008	Jumper 0805
4917	4822 051 20008	Jumper 0805
4921	4822 051 20008	Jumper 0805

5001	2422 549 42896	Bead 120Ω 100MHz
5002	3198 018 33970	0.39µF 10% 0805
5201	4822 526 10704	Bead 50 Ω at 100MHz
5202	2422 549 42896	Bead 120Ω 100MHz
5203	2422 549 42896	Bead 120Ω 100MHz
5205	2422 549 42896	Bead 120Ω 100MHz
5206	2422 549 42896	Bead 120Ω 100MHz
5207	2422 549 42896	Bead 120Ω 100MHz
5208	4822 526 10704	Bead 50 Ω at 100MHz
5209	2422 549 42896	Bead 120Ω 100MHz
5210	2422 549 42896	Bead 120Ω 100MHz
5211	2422 549 42896	Bead 120Ω 100MHz
5212	2422 549 42896	Bead 120Ω 100MHz
5213	2422 549 42896	Bead 120Ω 100MHz
5214	2422 549 42896	Bead 120Ω 100MHz
5215	2422 549 42896	Bead 120Ω 100MHz
5216	4822 526 10704	Bead 50 Ω at 100MHz
5295	4822 526 10704	Bead 50 Ω at 100MHz
5330	4822 526 10704	Bead 50 Ω at 100MHz
5331	4822 526 10704	Bead 50 Ω at 100MHz
5351	4822 157 50961	22µH
5352	2422 535 94257	0.22 µF
5355	4822 157 50961	22µH
5361	4822 526 10704	Bead 50 Ω at 100MHz
5401	2422 535 91032	COI LINCOR 50UH C911-01 Y
5401	2422 535 94914	COI LINCOR 37UH5 W8040-001 B
5402	2422 531 02617	PSD12-205B B
5405	2422 536 00846	SC15334-00 B
5408	4822 157 11711	Choke coil
5450	2422 531 02471	LOT JF0501-2135 21" / 25"
5450	2422 531 02472	LOT JF0501-2136 29"
5451	4822 157 70698	27µH
5500	4822 157 10476	DMF-2820H
5501	4822 157 11523	Line filter 5mH/2A
5502	2422 549 44694	Mains harmonic filter 65mH
5511	4822 526 10704	Bead 50 Ω at 100MHz
5512	2422 531 02634	SS42315-01 B
5531	2422 531 02631	SS22220-03 B
5551	4822 526 10704	Bead 50 Ω at 100MHz
5552	4822 157 71401	27µH
5561	4822 526 10704	Bead 50 Ω at 100MHz
5562	4822 526 10704	Bead 50 Ω at 100MHz

6001	4822 130 34142	BZX79-B33
6004	4822 130 11525	1SS356
6006	4822 130 34382	BZX79-B8V2
6203	4822 130 11397	BAS316
6204	9322 128 70685	SMSS14
6205	9340 548 69115	PDZ27B
6207	4822 130 11397	BAS316
6209	4822 130 80622	BAT54
6210	3198 020 55680	BZX384-C5V6
6211	3198 020 55680	BZX384-C5V6
6331	4822 130 30842	BAV21
6332	4822 130 30842	BAV21
6333	4822 130 30842	BAV21
6361	5322 130 34337	BAV99
6376	5322 130 34337	BAV99
6383	4822 130 31607	RGP10D
6403	4822 130 10871	SBYV27-200
6404	9322 169 61687	DMV1500M
6406	9334 939 60673	RGP10G
6407	9322 197 45703	BAV21WS
6408	9322 197 45703	BAV21WS
6410	5322 130 31559	BY448
6441	9322 150 20685	BZX384-C68
6442	9322 150 20685	BZX384-C68
6443	4822 130 11551	UDZS10B
6450	4822 130 11397	BAS316
6451	4822 130 11148	UDZ4.7B
6452	4822 130 10871	SBYV27-200
6453	9334 939 60673	RGP10G
6454	9334 939 60673	RGP10G
6455	9334 939 60673	RGP10G
6456	4822 130 11045	PBYR10100
6457	4822 130 11397	BAS316
6458	4822 130 11397	BAS316
6459	9334 939 60673	RGP10G
6482	4822 130 11416	PDZ6.8B
6483	9322 197 45703	BAV21WS
6484	9322 197 45703	BAV21WS
6486	4822 130 30842	BAV21
6488	4822 130 11397	BAS316
6489	9340 548 71115	PDZ33B
6500	3198 010 10640	Bridge cell GBU4K
6511	4822 130 31607	RGP10D
6512	4822 130 80622	BAT54
6514	4822 130 11397	BAS316
6531	4822 130 11522	UDZ15B
6532	9322 197 45703	BAV21WS
6533	9322 171 80685	BZX384-B6V8
6534	9322 199 75685	BZX384-B3V9
6535	9965 000 01541	SB160
6536	9322 198 25673	SB180
6538	4822 130 11397	BAS316
6541	9340 548 61115	PDZ12B
6551	9322 198 41687	STTH8L06D
6562	9322 161 78682	SB360L-7024
6563	9322 161 78682	SB360L-7024
6564	4822 130 11397	BAS316
6565	4822 130 11551	UDZS10B
6566	4822 130 11397	BAS316
6571	5322 130 34331	BAV70
6572	9340 548 54115	PDZ6.2B
6573	4822 130 30862	BZX79-B9V1
6575	4822 130 31878	1N4003G
6602	5322 130 34337	BAV99
6691	9322 172 20682	LED LTL-102SRHAP (LITO) B
6692	9322 174 42667	IR RECEIVER TOSP4136UH1(VISH)L

7001	4822 130 63732	MMUN2212
7200	9352 749 95557	TDA12011H1/N1B51
7201	4822 130 62343	IMX1
7202	4822 130 11155	PDTC114ET
7203	4822 130 41246	BC327-25
7204	4822 130 41246	BC327-25
7205	5322 130 60159	BC846B
7207	5322 130 60159	BC846B
7208	5322 130 60159	BC846B
7209	9340 547 13215	BSH103
7210	9340 547 13215	BSH103
7331	5322 130 60159	BC846B
7332	4822 130 60373	BC856B
7361	5322 130 60159	BC846B
7362	4822 130 60373	BC856B
7366	4822 130 60373	BC856B
7376	4822 130 60373	BC856B
7381	4822 130 40855	BC337
7382	4822 130 40855	BC337
7404	9340 547 13215	BSH103
7405	9340 550 92127	BU4508DX
7406	9322 197 37676	KTC3228Y
7408	5322 130 60159	BC846B
7410	4822 130 60373	BC856B
7411	4822 130 60373	BC856B
7451	9322 195 14687	KTD600KY
7452	9322 197 37676	KTC3228Y
7453	9322 195 05687	KTB631KY
7454	5322 130 60159	BC846B
7455	4822 130 60373	BC856B
7456	4822 130 60373	BC856B
7482	3198 010 44010	PDTA114ET
7483	4822 130 60373	BC856B
7484	5322 130 60159	BC846B
7511	9352 720 43118	TEA1506T/N1
7512	9322 174 27687	FQPF7N80
7513	8238 274 02070	TCET1103G
7514	5322 130 60159	BC846B
7531	9352 739 52112	TEA1620P/N1
7532	4822 130 60373	BC856B
7541	4822 130 60373	BC856B
7561	9340 547 00215	PDTC143ZT
7571	4822 130 40959	BC547B
7573	4822 130 11155	PDTC114ET
7601	9322 147 25682	M24C16-WBN6
7603	4822 209 15576	LE33CZ
7604	5322 130 60159	BC846B
7605	4822 130 41246	BC327-25
7606	5322 130 60159	BC846B
7990	4822 209 32641	TDA2616Q
7991	5322 130 60159	BC846B
7992	5322 130 60159	BC846B

CRT Panel [B]

Various

0028	3139 121 27391	DOUBLE COMP CLIP
0085	4822 492 70788	Fix IC
1254	2422 500 80087	Socket CRT 9p
1331	4822 265 41113	7P
1351	4822 265 30735	Connector 5p
1361	4822 267 10735	Connector 3p
1381	4822 267 10735	Connector 3p

2351	2038 031 92009	10µF 250V
2352	4822 126 13435	1.2nF 10% 2kV

7330	9352 636 44112	IC TDA6107AJF/N1B (PHSE) L
7363	9322 195 05687	KTB631KY
7364	9322 195 14687	KTD600KY

Side AV & Headphone Panel [D]

Various

0205	3139 124 48601	SIDE AV BKT HOR(3P+HP+SV)10778

Top Control Panel [E]

Various

0085	4822 492 70788	Fix IC
1331	4822 265 41113	7P
1351	4822 265 30735	Connector 5p

2330	4822 121 40518	100nF 10% 250V
2331	5322 126 11583	10nF 10% 50V 0603
2332	2020 558 90621	10nF 630V
2333	5322 126 11578	1nF 10% 50V 0603
2351	2038 031 92009	10µF 250V

3328	4822 051 30101	100Ω 5% 0.062W
3329	4822 051 30101	100Ω 5% 0.062W
3330	4822 051 30101	100Ω 5% 0.062W
3331	4822 116 52175	100Ω 5% 0.5W
3332	3198 013 01020	1kΩ 20% 0.5W
3333	4822 116 52175	100Ω 5% 0.5W
3334	3198 013 01020	1kΩ 20% 0.5W
3335	4822 116 52175	100Ω 5% 0.5W
3336	3198 013 01020	1kΩ 20% 0.5W
3354	3198 013 01520	1.5kΩ 20% 0.5W
3356	4822 050 21009	10Ω 1% 0.6W
3357	2122 552 00004	1mA 18V 0603
4337	4822 051 30008	Jumper 0603

5330	4822 526 10704	Bead 50 Ω at 100MHz
5351	4822 157 50961	22µH
5352	2422 535 94257	0.22 µF

6331	4822 130 30842	BAV21
6332	4822 130 30842	BAV21
6333	4822 130 30842	BAV21

7330	9352 636 44112	IC TDA6107AJF/N1B (PHSE) L

Linearity & Panorama Panel [G]

Various

0150	3122 120 01701	FACTORY PLATE
1462	4822 267 10735	Connector 3p

2468	2022 031 00172	2.2µF 160V
2470	4822 121 10781	470nF 5% 250V
2471	4822 124 40248	10µF 20% 63V
2472	4822 124 21913	1µF 20% 63V
2474	4822 121 42365	330nF 5% 250V

3470	4822 053 11153	15kΩ 5% 2W
3471	4822 116 52276	3.9Ω 5% 0.5W
9460	3198 036 90010	Wire 0.58mm

6463	4822 130 30621	1N4148
6464	9334 939 60673	RGP10G

7463	4822 130 40959	BC547B

Front Control

Various

0002	3141 057 66871	F/CAB AS 32FL9 F.SILVER AP
0050	3141 050 00281	WORDMARK PHILIPS (62X14)_11027
0341	3104 300 40171	Ptv screw 12+integr.washer

5213	2422 264 00496	LSP 8R 15W COM FULR O57X238 B
5214	2422 264 00496	LSP 8R 15W COM FULR O57X238 B

Mains Harmonic Module [U]

Various

0002	2422 025 16374	Connector 2p m
0084	3139 124 39951	MAINS HARMONIC BRACKET ITV
0127⚠	4822 265 11253	Fuse holder
1000⚠	2422 086 10914	Fuse 4A 250V
1001	4822 265 20723	Connector 2p

2001	4822 121 10798	33nF 5% 400V
2002	4822 126 13589	470nF 275V

3000	3198 013 01020	1kΩ 20% 0.5W
3002	4822 053 21155	1.5MΩ 5% 0.5W

5000	2422 549 44444	Filter 56MHz

11. Revision List

Manual xxxx xxx xxxx.0

- First release.